The Iron Age

A Review of the Hardware and Metal Trades.

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The Little Giant Steam Engine.

The engine and boiler which we illustrate is intended to furnish a small motive power at a very low price. In a vast number of small shops power is wanted to do light work, such as running lathes, pumping water, and running printing presses, etc. Most engineers, when turning their attention to small power steam engines, have not attempted to provide an engine so small as to be within the reach of the small workman and the amateur machinist.

One of the great difficulties in the way of the manufacture of these small powers is the production of a cheap, good and safe boiler. We may say that this is really the only difficulty in the way of the production of such an engine, and it is the one which has deterred many builders from attempting to build engines and boilers for very small powers.

The boiler of the Little Giant Engine is, therefore, one of its most important points. Figure 2 shows the boiler with the external casing removed. The body of the boiler B is made from lap welded tubing of 10 inches diameter in the small sizes and 12 inches in the 3-horse engine. The bottom is closed with a cast iron cap D, screwed on. The top head A is also of cast iron, screwed on; it is provided with a projecting flange, as shown in the cut, for the purpose of holding the sheet iron casing with which the boiler is surrounded, and which incloses the fire. To obtain sufficient heating surface there are 29 lap-welded water tubes projecting into the fire space around the boiler. These tubes, C C, which are 15 inches long, start from the bottom of the body of the boiler and extend upward to a point just below the water line. The couplings E F are for the purpose of connecting the feed pipes. The three couplings projecting from the main body of the boiler above the tubes are for the attachment of gauge cocks; this length is necessary to get the coupling out through the casing by which the boiler is surrounded, which is just large enough to clear the tubes.

The boiler for the one-horse engine is only 3 feet 4 inches high by 18 inches in diameter. The engine itself is so small as to seem almost a toy, yet one of these little machines with 4½ inch stroke and a cylinder of 2¾ inches diameter, is capable of working up to something over one horse-power, at 300 revolutions per minute. One of these engines, which we have examined, we found to be making almost double this speed, and, at 70 pounds pressure, was probably ably exerting nearly three horse-power. The small size of these engines, and the lightness of the parts, make it possible to run them at a very high rate of speed. Each boiler is tested to a pressure of 250 pounds to the square inch, but the bursting pressure would not be less than 1000 pounds per square inch. The working pressure is anywhere from 70 to 100 pounds. The consumption of coal per day for a single horse-power is so small as to be hardly worth noticing, the one horse-power engine taking about as much coal per day as a cooking stove, and the larger sizes in proportion. The boiler is fitted so as to burn either coal or wood.

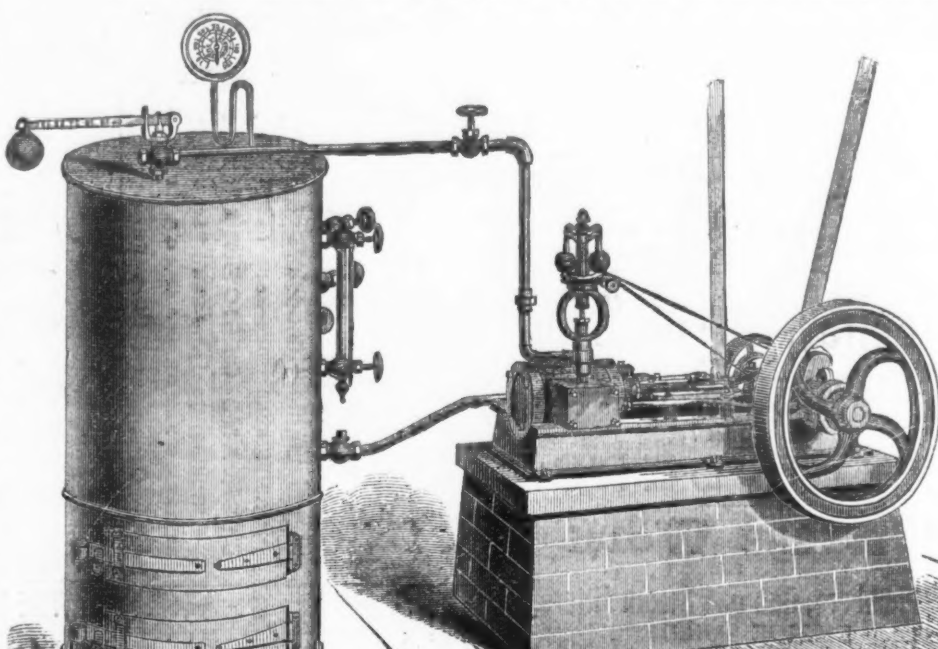
The engine itself is of the horizontal D-valve type. The valve is worked by a single eccentric. The connection between them is made by means of a valve rod flattened so as to spring, and thus do away with the necessity for a joint. The governor is driven by a belt from a pulley beside the eccentric. The pump is of the locomotive pattern, and is driven from the cross head. The engine is fitted upon a box made of plank, and painted to represent brick work. This is some 13 inches high by a trifle over 2 feet long. It is made of 1½ inch plank, and serves as a foundation, being secured to the floor by braces. The price of the one-horse power complete and ready for running is only $150.

In finish and fittings the engines seem all that could be desired. The pillow blocks are Babbitted; both ends of the connecting rod are fitted up with straps and brasses neatly finished and furnished with keys and wedges for taking up lost motion. The guides are also fitted with brasses. The friction surfaces are of good size.

We give a table showing the dimensions, in inches, of the different sizes of these engines, and also the number of revolutions per minute:

H. P.	Diam. of Cylinder.	Stroke.	Fly Wheel. Diam.	Fly Wheel. Face.	Pulley. Diam.	Pulley. Face.	Revolution per min.
1	2¾	4½	16	1¾	6	3	300
2	3¼	5	20	2	8	5	250
3	3¾	5½	24	2½	10	4	200

Mr Ward B. Snyder, of 84 Fulton street, in this city, is manufacturing this engine, and is prepared to fill orders for them.



THE LITTLE GIANT STEAM ENGINE.—*Fig.* 1.

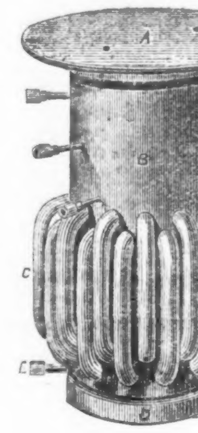


Fig. 2.

Hall's "Sudden Grip" Vise.

We show in the accompanying illustrations an improved vise invented by Mr. Thomas Hall, No. 411 Fulton street, Brooklyn, N. Y., which possesses features of novelty and value. The vise is held in its place on the table by an automatic swivel, on which it is free to move. Attached to the movable jaw is a handle, by which it can be moved to and from the fixed jaw between the extreme limits of its traverse, while the faces of the jaws remain perfectly parallel under all circumstances. When any article is to be held in the vise, the moving of the handle instantly adjusts the jaws to hold it, whatever its size, and the grip of the jaws is as easily and quickly loosened by moving the handle in the reverse direction. It is only necessary to push the movable jaw against the article to be held, and then depress the handle as in Fig. 2, when its weight produces a powerful grip and locks the vise tightly, beside locking the swivel at the angle at which the article is gripped. The arrangement by which this automatic locking of jaws and swivel is produced is very ingenious, and, so far as we know, quite original. When there is nothing between the jaws, or so long as the handle is held up, the vise can be turned on its swivel at the will of the operator, as shown in Fig. 1, but the moment the grip is set the vise becomes immovable upon the table. By raising the handle again, both jaws and swivel are set free simultaneously. In the sectional cut marked Fig. 3 the mechanism by which this is accomplished is shown very clearly. B is the stationary jaw through which the movable jaw A, the straight part of which is cored out, passes. P is the bed plate, made in two pieces so as to be adjusted into the dovetail formed by the lower portion of the jaw B. To retain this plate in place, a wedge W is driven in between the sections, spreading the same just sufficiently to make a neat fit with the jaw base. Above the plate P, and held in front and rear by the lower portions of B, is a steel rack plate H. The rear end of this is secured, and the entire plate prevented from rising by the screw N. The lever handle has cast, on each of the sides of its inner end, a disk. These disks are inserted in a socket in the outer extremity of jaw A, and held in place by friction straps T, which are adjusted to hold said disks loosely or tightly by means of the set screws S. On the inner portion of the disks is a pin K, which, when the lever is raised as shown, presses down the end of a pivoted bar J, located inside the hollow jaw. This bar raises the toothed clutch G, and disengages the teeth of the same from the rack H. Under these conditions, it will be seen that, by pulling or pushing on the handle, the jaw A, may be drawn out or shoved in very easily, and so adjusted in contact with the work. As soon as this is done, the lever handle is pushed down. The effect is to release the lever J, and so as to allow clutch G, to drop, and also to draw a bar D, which is pivoted to the handle disks, outward; and thus the end of the bar acts as a wedge to push down the joint E E, and so to force the clutch G forward, to act against the rack teeth. As the part E of the clutch bears against the bar R, which is cast with the jaw A, it is evident that, acting on the bar, R, as an abutment, the extension of the toggle joint tends to carry jaw A inward with great force, and so to grasp the object inserted between the jaws very tightly. As soon as the lever is raised to loosen the work, the coiled spring L, acting on the upward turned end of the clutch G, carries the latter to the rear, and so removes it from the rack teeth, and at the same time returns the toggle joint to its normal position. It will be seen from this that the tendency of the downward, as well as backward, thrust of the toggle joint is to raise the jaws. This action is also utilized to prevent the turning of the vise on its swivel after the grip is on.

The chief point of merit in this vise is the ease and rapidity of its operation, and the steadfastness of its grip. It is also very strong. When the handle is depressed it is entirely out of the way of the workman. This vise received the Medal of Progress and a diploma of honor at the Vienna Exposition, and the first premium at the fair of the Franklin Institute, Philadelphia, in 1874—the only times it has been exhibited. These vises are equally adapted to heavy and light work, and will form valuable additions to workshop plant. Mr. Charles Parker, Meriden, Conn., is the manufacturer.

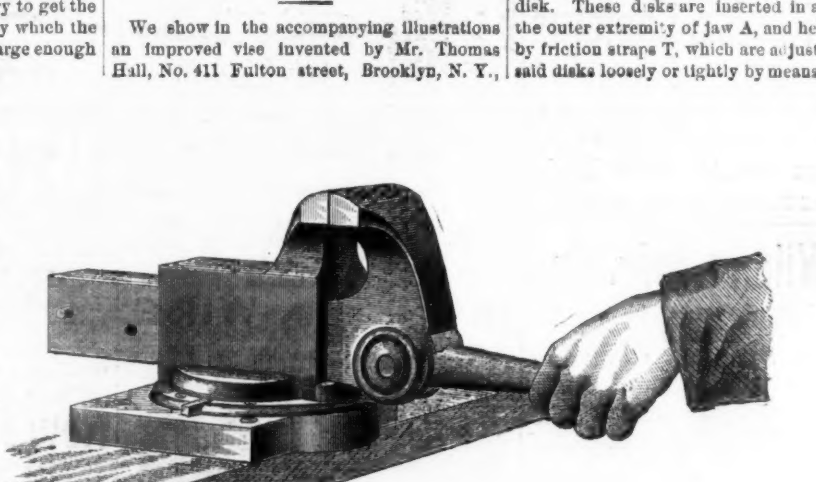


Fig. 1.

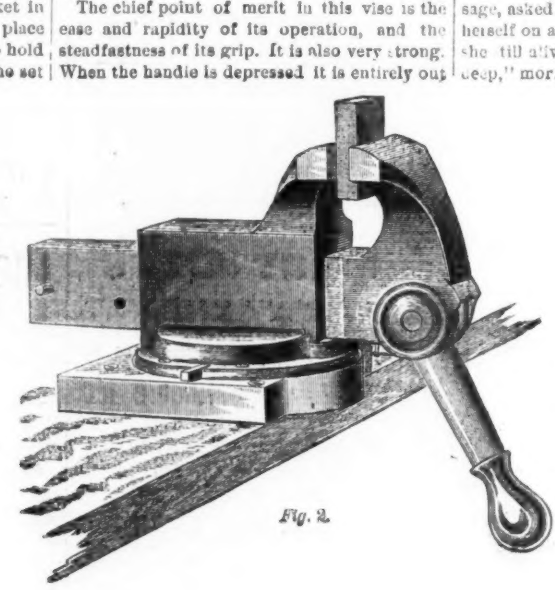


Fig. 2.

HALL'S "SUDDEN GRIP" VISE.

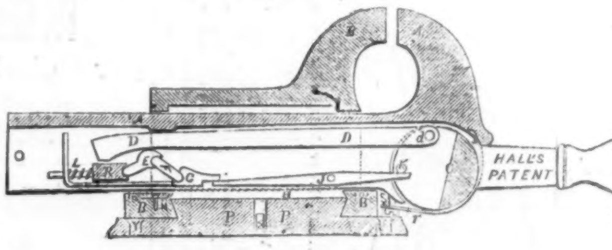


Fig. 3

Miniature Steam Engines.—Mr. C. C. Thomas has on exhibition at the fair of the San Francisco Mechanics Institute a steam engine which can easily be covered by a thimble. It is of the vertical type, three-quarters of an inch inch in its greatest hight. The cylinder is one eighth of an inch bore and three-sixteenths of an inch stroke. The valve moves one-thirty-second of an inch. The engine is made of gold and silver, the working parts, however, being made of steel. The whole thing is set on a California gold dollar and can be covered up with a No. 6 thimble. Mr. Thomas made a little lathe to turn out the different parts of this machine, and every piece is as perfect as it would be in one of a large scale. The engine is all constructed in such a manner as to be taken apart, the whole being made like an ordinary engine. It is exhibited behind a magnifying lens and attracts much attention. A calculation shows it to exert one twenty-five hundredth part of a horse-power. Mr. Thomas has nearly completed one still more curious and interesting, which will probably be shown at the Centennial. It is a horizontal steam engine on a gold tool plate just half an inch long. It will have a cylinder one-sixteenth of an inch bore and three-thirty-seconds of an inch stroke. The valve in this engine will move only one-sixty-fourth of an inch. It will be complete in all its parts like the other, and admit of being taken apart and put together. We examined the pieces of this little marvel of mechanism the other day, and under a glass one could see with what skill the different parts were made and how delicate they were. It is now nearly completed and when done will without doubt be the smallest engine in the world, being even more diminutive than the vertical engine.

A Transatlantic Steam Passage in 1838.—A writer in the Philadelphia *Ledger*, who claims a personal recollection of the events, thus describes the first applications of steam in ocean transit:

It was a jubilee day in New York, April 23d, 1838, and the captain and officers of the Sirius, that vessel having been six days longer on the passage than the other, were in a placable frame of mind. The Great Western officers stood more on their dignity, and strove to repel the officious greetings of the "longshoremen" and "interviewers." They even refused to throw a line to the "news boat," the said boat being a great institution in those sailing packet days. The captains of the packets had made it a point to be very civil to the news gatherers, as a good word from these respective journals counted for something. But the Great Western, proud of her fifteen days' passage, asked no favors. She could not plume herself on a fifteen days' passage now, were she still alive. But her bones lie "five fathom deep," more or less, in the Irish Sea. At her dock she tried to repel boarders by a small fee. She might as well have tried to keep out rats and roaches. The "Pike slip" boys boarded her as the Society Island natives boarded Captain Cook, and some agile fellows swung themselves from the rigging of a schooner lying near to the rigging of the Great Western, and so came down on deck over the sentries' heads. It was a great day for all sorts of people, and the mayor and corporation did not miss so grand an opportunity for an aldermanic frolic at the city's expense. Times have changed, and the arrival and departure of ocean steamers is no longer an "event."

The Sirius sailed on her return trip on the 1st, and the Great Western on the 8th of May. On the 19th of July the Royal William arrived, fourteen and a half days from Liverpool, being the first steamer to start from that port to cross the Atlantic. In 1819, however, the Savannah, Captain Rogers, arrived at Liverpool from Savannah in twenty-six days. The Savannah was built in New York, for Daniel Dodd, by Francis Fickett. Her engines came from New Jersey, being constructed by Stephen Vail, at the Speedwell Works, near Morristown. The Savannah was not, however, a complete steam vessel. She used her wheels only in calm weather, or when the wind was light or adverse. The sails were her principal dependence, the steam supplementary. The Savannah went to Stockholm, and King Bernadotte visited her, and presented Captain Rogers with "a stone and muller," whatever that sentence may mean. She went to Russia, and brought away a silver tea kettle from the Emperor. She went afterward to Constantinople, and there the Sultan plied the captain with presents, and perhaps bought his ship. At any rate, the Savannah ended her days in the Turkish waters.

Some very rapid work in the formation of cutlery was lately done at Beaver Falls, Pa. On the evening of Monday, Sept. 6th, the first casting was made from the Siemens furnace, at the new steel works of Messrs. Abel Peddie & Co. On the following morning the ingots were rolled down, a bar was taken out to the works of the Beaver Falls Cutlery Co., and within an hour and a quarter it was returned in the shape of half a dozen table knives of excellent temper and finish. The new works are well built and provided with an excellent plant, and the enterprise gives every promise of success.

The Atchison Bridge.

The great bridge over the Missouri River, at Atchison, Kansas, which was opened with interesting ceremonies on the 4th instant, was built by the American Bridge Company. Work was begun on the 9th of August, 1874, under the direction of Major O. B. Gunn, engineer, assisted by Capt. Marion. The structure was completed July 31, 1875. On the 30th of July, at 4 o'clock in the afternoon, less than one half of the iron for the last span was in place, and the balance, over 100 tons, was lying upon the east shore, a portion of it over a quarter of a mile distant, and all of it had to be trucked 600 feet, and across the two spans already raised. All of this immense weight, consisting of about 300 pieces, ranging in weight from 50 to 4000 lbs. each, was brought forward, raised in place, connected, and made ready to swing, in the unprecedented space of 12 hours, being undoubtedly the fastest time on record, and this too notwithstanding a heavy wind was blowing from the north, attended with sufficient rain for three hours to render everything wet and slippery. The following description of the work, condensed from a long account of the bridge and the opening ceremonies, published in the Atchison *Standard*, of recent date, will be read with interest:

The bridge is of wrought iron (rectangular truss) on stone piers, and is for highway as well as railway traffic, with sidewalks for foot passengers. The width is 19 feet 6 inches from center to center, the sidewalks being 5 feet on each side. The trusses of the draw are 28 feet high at the ends and 36 feet in the middle over the pier; the trusses of the fixed spans are 28 feet. The bottom chord of the bridge is 10 feet above the high water of 1844. There is a drawspan on the western side 382 feet long, giving 160 feet clear water way on each side; and three fixed spans of 260 feet each—giving a total length of bridge, including abutments (20 feet), of 1182 feet. The approaches—1500 feet on the east and 500 on the west side—are earth embankments. The west approach reaches the street grade at Second street, and the eastern approach descends with a grade of 52 feet per mile, for about a quarter of a mile, where it reaches the level of the Hannibal & St. Joseph and the Chicago, Rock Island & Pacific tracks. The west end is directly opposite the termini of the Atchison, Topeka & Sante Fe and the Central Branch U. P. Railroad tracks, and nearly opposite the depots of the Atchison & Nebraska and Missouri Pacific Railroads.

The foundations consist of four piers and two abutments, the pivot pier being circular, and 46 feet in diameter, and the other three piers being 24x52 feet at the base and 9x26 feet at the top. The total hights of the piers from bed-rock are: Pivot pier (No. 2) 77 feet; No. 3, 92 feet; Nos. 4 and 5, each 105 feet. All of the piers are built of solid masonry of the best quality, laid in hydraulic cement. They were built and sunk upon inverted caissons by the pneumatic process. The west abutment rests on oak piles, driven to bed-rock, and cut off five feet below water mark. The east abutment has a similar foundation, except that the piles have not been driven to bed rock, that not being deemed necessary. The caissons of the main piers were built of solid timber, with working chambers underneath corresponding in dimensions to those of the pier's base. Above the working chamber is nine feet thickness of solid timber—consisting of layers of large square timber laid at right angles to each other, and every piece bolted through its whole length to the underlying timber. The weight of the three ordinary pier caissons is 450 tons each. The caisson for the pivot pier was 46 feet square and 18 feet in hight, and contains 388,000 feet of timber, board measure. The original plan contemplated iron pneumatic tubes, and several of the huge sections for the cylinders were shipped, but it was found that masonry piers could be constructed at much less cost. This was partly due to the fact that a very superior stone—a limestone of exceptional specific gravity and hardness—could be obtained in very thick block and in unlimited quantities at Cottonwood Falls, on the immediate line of the Atchison, Topeka & Santa Fe Road, 131 miles from Atchison. The chief difficulty presented in the sinking of these piers arose from the extreme depth of the bed-rock and the depth and force of the current. The average depth to which the four piers are sunk below water is 66 feet; at Leavenworth it was 45 feet, at St. Joseph 55 feet, and at Boonville 87 feet.

The superstructure is of wrought iron, and each member is of sufficient strength to sustain six times the strain which the passage of an ordinary freight train will subject it to. The trusses of the draw span are 18 feet apart in the clear, 28 feet high at the ends, and 36 feet high in the middle, over the pivot pier. Each truss is divided into 28 pannels, 14 to each span, with inclined end posts, and vertical intermediates, after the plan of the Pratt truss, one of the oldest and best approved plans for long span bridges. The end posts and chord bars are of rolled channel bars, and the intermediate posts and vertical struts of rolled beams, after a design by Wm. G. Coolidge, Esq., the engineer of the American Bridge Company, and used in the Atchison Bridge for the first time. The fixed spans, three in number, are similar in general features of construction to the draw spans, except that the lower chords are made of chord bars, with pin connections, instead of channel bars; and the upper chords are straight with a slight camber, instead of being curved vertically, as in the draw span.

The pivot or draw span is supported on the pivot pier, at the central point, by an immense steel pointed iron pivot, around which the entire weight of the draw span, 500 tons, turns when the draw is swung. A circular track of steel rails, 30 feet in diameter, is laid upon the top of the pivot pier, and traversed by 24 large iron wheels, each connected at its center by an iron rod or axle with the center pivot. Upon these wheels rests a circular frame work of iron about 4 feet high, and of great strength, upon which the bridge trusses rest. The whole forms a turn table of immense strength, upon which the great draw span turns with perfect ease when being opened or closed. The draw fixtures are worked by a steam engine, and machinery which is located in an engine house built over the pivot pier, and supported by an iron platform 20 feet above the floor of the bridge. By aid of this machinery the engineer can open and close the latches of the draw at each end, work the end adjustment, and open and close the draw at pleasure. Notwithstanding the great weight of this draw-bridge, equal to about 500 tons, it is so nicely ballanced and adjusted that the weight of one man at either end will cause a preceptible deflection, and two men can open and close it by hand. All the iron used in members sustaining tensions is of the best double refined American wrought, and those parts subjected to compression, whether of wrought or cast, are of the very best quality. The strains which each member sustains, are based upon each span carrying its own weight, and a moving load of 2500 pounds per lineal foot, which is as great a load as the bridge will ever have to carry during the passage of the heaviest freight train. Each part is proportioned to carry six times such a load on an assumed strength of the iron of 60,000 pounds per square inch of area, as the ultimate strength of breaking load.

The floor and the railway track are supported by wrought iron I beams, fifteen inches deep and weighing 150 pounds per yard. Two of these beams are suspended side by side, at each panel of the bridge, and securely fastened by the pin connecting the post and chord bars. These floor beams support longitudinal stringers, which in turn support the railway track and the plank flooring for highway travel. Wheel guard timbers are placed on each side of the roadway to prevent the contact of passing wagons with the iron work of the bridge. A sidewalk of five feet in in width is built along the entire length of the bridge, on each side, and on the outside of the truss.

American Competition with English Edge Tools.

The Birmingham *Daily Post* says:

English edge tool makers in particular are fully aware of the success with which certain of their business rivals in America have hustled them in many of our home and foreign markets. So large, however, is the demand at present for good edge tools of almost every description, that there are few edge tool firms in the United Kingdom who have not got plenty of orders upon their books. The English article is not, therefore, out of use, but there is a perceptible increase in the favor in which handy and thoroughly excellent tools are held, both at home and abroad; and this is being encouraged by the growing facilities for manipulating steel, both shear and cast. Sensible of this, certain American firms are pushing their opportunity. Hence it comes about that American forks and shovels and axes are to be had wherever edge tools are offered in this country. But it would seem that the Americans believe that they can compete with us much more successfully by having branch establishments to manufacture their specialties in this country, rather than by shipping their products from the other side. A firm of cast steel shovel makers at Pittsburgh (Messrs. Hussey, Binns & Co.), who have recently brought out a shovel in which the straps, though of iron, are compact with the steel during the process of casting, and who are making at a very low figure, and with very little manual labor, shovels that are getting very rapidly into use throughout the States, are now, through a representative who has recently come over from Pittsburgh to England, making inquiries which will regulate their action and determine them whether they will themselves begin to make in this country, or whether they will offer their process to English firms or to an English company. If American edge tool makers should begin to produce here goods that are already running English makers hard, then it is to be inferred that their example will be followed by other trans-atlantic hardware manufacturers. If, in such an event, the English firms will keep as well employed as they now are, is another matter.

Condition of the French Industrial Classes.—A committee of the French Assembly has just concluded an elaborate inquiry into the condition of the French working classes. The first broad conclusion arrived at is that artisans in France are no longer sensibly affected in point of health and longevity by the labor they pursue. The sanitary condition of workshops, if not all that could be desired, has undergone an immense improvement during the last quarter of a century, and further legislation in this direction is not required. Symptoms of physical deterioration are unfortunately to be met with, but the causes of this are significantly attributed to the abuse of alcoholic liquors and other excesses. Much is said on the subject of healthy dwellings, and it is gratifying to notice that a great advance has been made in this respect through the efforts of individuals, of companies and of municipalities. It is stated, for instance, that in the north 18 out of 23 mining companies expended 18,000,000f. on 7000 houses, occupied by 31,500 persons. The rent of these houses is said to be 30 per cent. lower than the average of the district; but, as they are simply built for the accommodation of the men and families employed at the various mines, a rigid economist might say that the low rent is taken into consideration in determining the rate of wages

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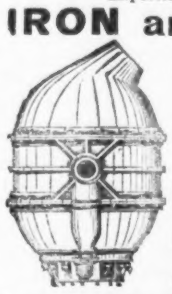

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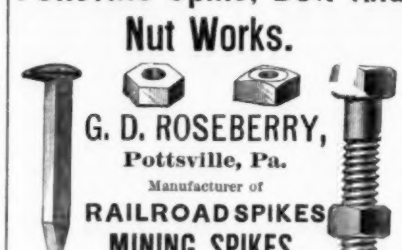

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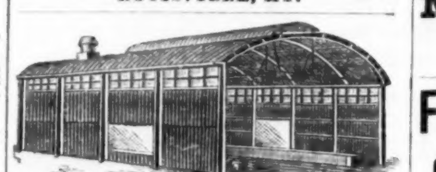

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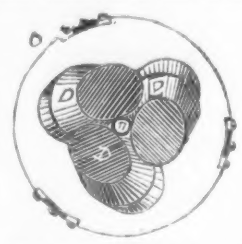
New Patents.

We take the following abstract of new patents, recently issued, from the official record:

MACHINE FOR WELDING AND FINISHING PIPE.

To Mildred Blakey, Etna, Pa.—Two or more concave faced rolls in a revolving stock, angular to the line of feed, and acting circumferentially on the pipe, grooved feed rolls, tubular bearing shaft, and mandrel.

1. For welding or finishing pipe, a series of two or more concave faced rolls arranged in a



rotating head or stock angularly to the line of feed, and when in operation revolving on their axes, and also acting circumferentially on the pipe, either by the revolution of the pipe inside the rolls or by the revolution of the rolls around the pipe.

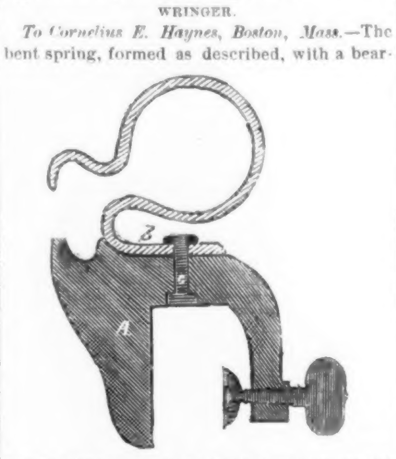
2. A series of two or more rolls D, arranged and operating as set forth, in combination with grooved feed rolls A A.

3. Two or more rolls, D, arranged to act circumferentially on the pipe or skelp, in combination with a tubular bearing, axle or shaft through which the skelp or pipe is fed and delivered.

4. A mandrel, *c*, in combination with revolving circumferentially bearing rolls D.

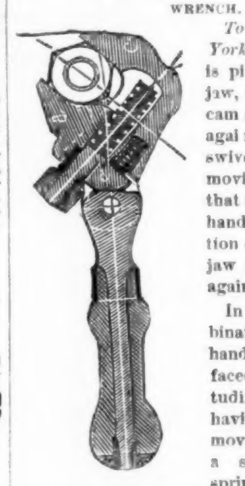
WRINGER.

To Cornelius E. Haynes, Boston, Mass.—The bent spring, formed as described, with a bear-



ing for the upper roll in its free end, in combination with the standard formed with a bearing for the lower roll, and a seat upon which the spring is fixed and held.

WRENCH.

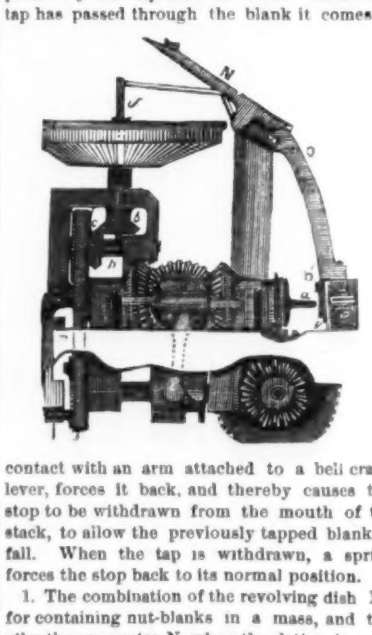


To Peter Samuel, New York, N. Y.—The handle is pivoted to the fixed jaw, and has a double cam at the pivoted end, against which the swiveled arm of the moving jaw bears, so that a movement of the handle in either direction causes the moving jaw to impinge tightly against the nut.

In a wrench, the combination of a pivoted handle having the two faced cam with a longitudinally recessed head having a fixed jaw, the movable jaw *a* having a swiveled arm *d*, a spring, and screw *b*.

MACHINE FOR TAPPING NUTS.

To Samuel L. Worsley, Providence, R. I.—The column of blanks in the receiving stack is supported by the tap when at work. When the tap has passed through the blank it comes in



contact with an arm attached to a bell crank lever, forces it back, and thereby causes the stop to be withdrawn from the mouth of the stack, to allow the previously tapped blank to fall. When the tap is withdrawn, a spring forces the stop back to its normal position.

1. The combination of the revolving dish M′, for containing nut-blanks in a mass, and the vibrating separator N, when the latter is constructed with a shovel end, *m*, a mortise *n*, and guard *o*.

2. The combination of the vibrating mortised separator N with a stationary receiving stack and a spring check.

3. The combination of the threading tap *a* with the devices, substantially as described, for discharging the nuts one by one.

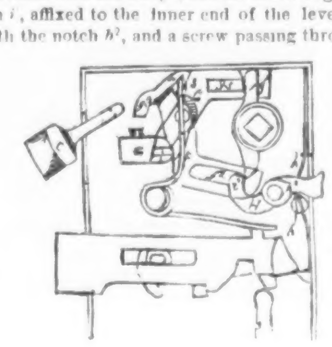
4. The combination and arrangement of the threading-tap *a* with the stack O and holder O′ for the nut blanks, whereby the said tap, while threading the blank in the column of blanks next above the last threaded blank, shall support the whole column of blanks above the tap while the underlying nut is being discharged.

REVERSIBLE LATCH.

To John Moore, Brooklyn, E. D., N. Y.—1. The jointed sliding link or horseshoe, in combination with the tail piece of a detachable latch and the horns of a knob shaft hub.

2. The combination of the pivoted joint F of the horse shoe with the lever H, projecting through the shell of the lock.

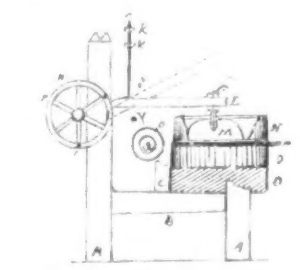
3. The combination of the pivoted joint F, provided with the slot f', and the movable guide pin i, affixed to the inner end of the lever H, with the notch h^2, and a screw passing through



the lock, for the purpose of maintaining the pin i in suitable position to act as a guide for the horseshoe in its reciprocating movement.

MEAT CUTTER.

To A. B. Good, Conestoga, Pa.—The levers carrying the knives strike against a bar situated



under the rear ends of the levers, and the descent of the knives is accelerated by the reaction of the bar. The combination of the knife-carrying levers L, and the arresting bar Y.

HAND VISE.

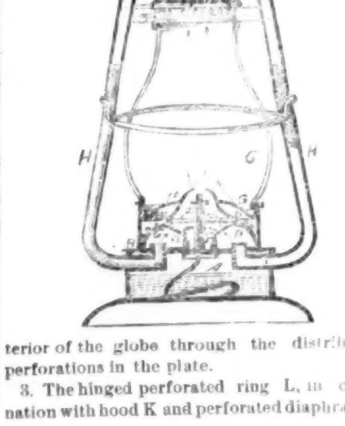
To Leonard L. Pollard, Worcester, Mass.—A portion of the screw shank is smooth, and fits in a corresponding socket in the upper end of the handle, to protect the screw thread from dirt or fillings.

The hand vise herein described, consisting of the pivoted jaws A A, springs *a a*, and screw shank B, the upper part thereof formed smooth, to fit with a close joint into a recess, E, in the handle C, said handle having a conical end, *d*, for operating the jaws.

LANTERN.

To Chas. J. Sykes, Chicago, Ill.—1. In combination with the tubes H H, arranged to pass into the oil pot and upward through the cover, the convexed cap C, forming chamber D, the latter communicating with the interior of the cone through the perforated plate *d*.

2. In combination with the removable perforated rim F, the plate G, arranged to receive the lower end of the globe, and to form chamber D′, the latter communicating with the in-

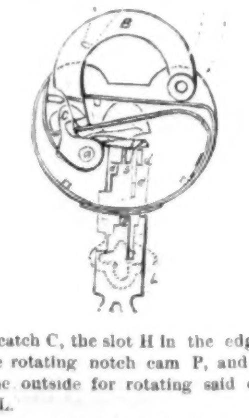


terior of the globe through the distributing perforations in the plate.

3. The hinged perforated ring L, in combination with hood K and perforated diaphragm *h*.

PADLOCK.

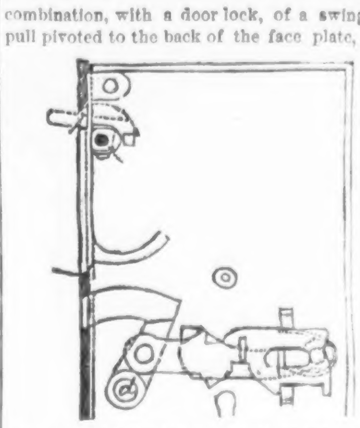
To Wm. H. Andrews, New Haven, Conn.—The combination, in a padlock, of the bar B, the



pivoted catch C, the slot H in the edge of the lock, the rotating notch cam P, and drop R upon the outside for rotating said cam, and the key L.

LOCK FOR SLIDING DOORS.

To Frank Corbin, New Britain, Conn.—The combination, with a door lock, of a swinging pull pivoted to the back of the face plate, and



provided with the tail piece *o*, stopping against the block *s* upon the inside of the lock case.

HARNESS SNAP.

(Issued Aug. 17th).

To Eleazer Kempshall, New Britain, Conn.—An extra notch or shoulder on the rear end of the tongue locks it in place, and prevents its being accidentally opened.

A snap hook, having the hook b^1, the inwardly swinging tongue *c*, having at its rear end the mortise *d*, with shoulder *e*, and the spring *f* lying within the pocket b^2.

The City of Peking.

Opinions having been expressed in journals unfavorable to American shipbuilding interests that the iron ships Peking and Tokio were badly constructed of poor materials, we print the following official report upon her condition by a board of engineers appointed to examine her at San Francisco:

SAN FRANCISCO, Aug. 26th, 1875.

The President and Board of Directors of the Pacific Mail Steamship Company: GENTLEMEN—As requested by you, we have surveyed the City of Peking at this port.

After a careful survey, we find that the ship has been strained during her passage from New York to San Francisco, caused by her being loaded too deep, and also from having her cargo and ballast stowed in the ends forward and abaft of the machinery space.

The consumption of coal lightened her four feet nine inches, and this was taken out of the amidships, leaving the ends loaded; the buoyancy under the amidship section—which is 140 feet in length, and above one-third of her entire displacement, or one-half of her carrying capacity in dead weight—is so heavy that in stormy weather the ship must have been under a strain such as no one would have prepared for. We are surprised to find that she has not received more damage than now exists or has been reported to us.

The damage to the vessel consists of loose rivets, which are scattered, showing that there is no local weakness, but a general straining of the vessel. At present, most of these rivets are in the after section, which excess, in our opinion, is due to the broken propeller, it having lost two contiguous blades, giving it an eccentric motion, causing a heavy jar to the after section of the vessel, the ship having run in this condition 71 days. We find that the straining of the vessel during the entire voyage of 83 days steaming in the condition as herein stated, shows in many places the effects of the strains she had been exposed to, and if not attended to will lead to greater expense in the future, as it is impossible to repair an iron ship efficiently that has been strained by making good those parts only that show damage.

It will require additional strength to make her equal to what she was when she left the port of New York. To accomplish this we recommend as follows, viz.: A box stringer on each bilge, to extend for a length of 250 feet amidships. A box-stringer on each side of orlop-deck, to extend for a length of 140 feet in machinery space. A box-stringer on each side of steerage deck, extending for a length of 380 feet amidships. The steerage deck to be of iron 7-16th of an inch thick, for a length of 244 feet amidships. The spar deck to be of iron 7-16th of an inch thick, for a length of 266 feet amidships. The bulkheads forward and aft of machinery space to be extended to sides of vessel between steerage and main deck. For the general arrangement we refer to the drawings, which show location. Rivets should be carefully sounded, and when found defective, be replaced. We request that the sounding be done with care, so as not to cause unnecessary damage.

We find that the ship's plating in holds below steerage deck and cross floors requires cleaning and painting. Also, repairs are required to the cementing in the bottom of the ship. After having made our survey of the vessel, we are surprised at the report made by the local inspectors at Hong Kong, wherein they prohibited the ship from carrying passengers, and we think they acted very unjustly toward the company. In support of this statement, no better evidence can be offered than the fact of the vessel never having damaged any cargo.

W. V. REANY,
Chief Surveyor of Iron Vessels United States Bureau Veritas.

D. F. HUTCHINGS,
Chief Surveyor of Pacific Coast of United States for Veritas.

SINCLAIR STUART,
Inspecting Engineer New York Underwriters' and American Shipmasters' Association.

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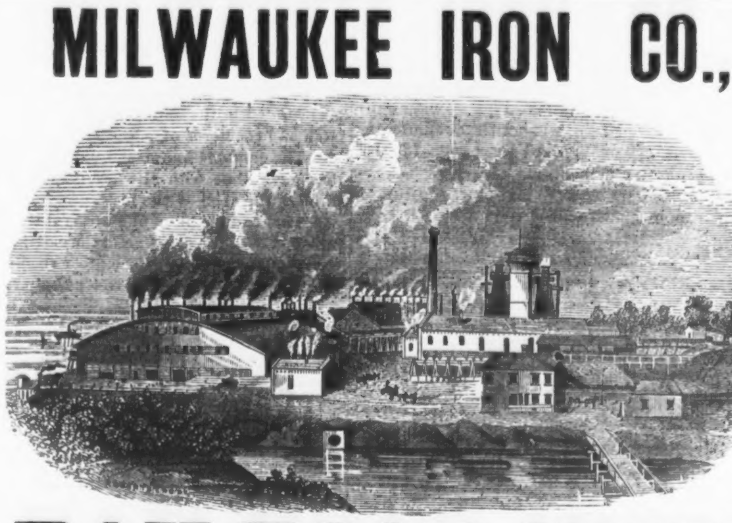

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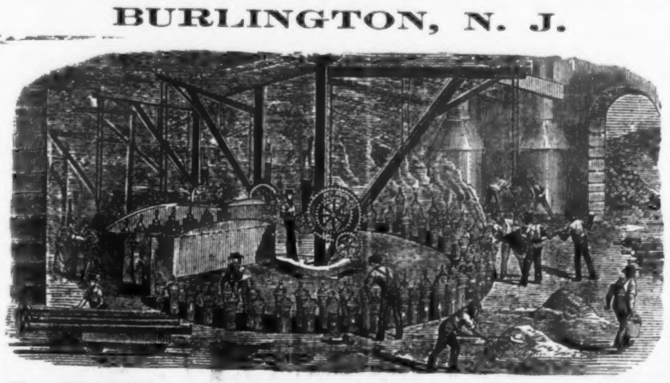

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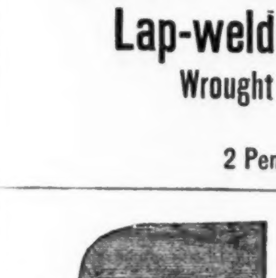

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Coes & Taft's Pat. Wrenches.	Cocoa Nut Dippers	Maguire's Wr't Iron Goods.
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Augers and Auger Bits.	Patent Tap Borers.	Axes, Picks and Hatchets.
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WHEELS AND AXLES MADE OF THE BEST STOCK AND IN THE MOST careful MANNER. FURNISHED SEPARATELY OR "FITTED" MAKING COMPLETE SETS.

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FISHER & NORRIS' Patent American Anvils and Vises.

On the Uses of Steel.

By J. Barba, Naval Constructor, Lorient.

No. IV.

Bending tests proved that the elasticity was materially altered within the zone around the holes. Strips of Bessemer plate, one edge of which was cut and the other punched, reached the form shown in Fig. 16. The cracks appeared always on the edges, especially on the punched side, and never in the middle. If this result is compared with that obtained with the Bessemer planed plates (Fig. 4) it will be seen that these tools had the effect of locally reducing the elasticity of the metal.

This zone of alteration appeared, according to the foregoing experiments, not to extend more than ·07 in. from the edge. It was then decided to find out if removing the zone surrounding the punched hole removed the cause of the results observed. New bars were cut from a Terre-Noire plate, and a cylindrical hole was punched ·669 in. in diameter, with a die ·708 in.; this hole was then enlarged, by cutting out a ring of metal ·039 in., ·078 in., and ·118 in. wide, so that the holes became ·747 in., ·825 in. and ·905 in. in diameter. With these the following results were obtained.

Table No. IX.

Width of Bars.	Greatest Diameter of Holes.	Resistance to Rupture in tons per squ're in. of Original Section.
in.	in.	
1·96	·747	32·20
1·96	·825	31·82
1·96	·905	32·27

So that bars of the same width 1·96 in. showed an ultimate resistance of 25·86 tons per square inch, with a punched hole ·669 in. in diameter, and more than 32 tons per square inch, with the same hole enlarged by ·708 in. Cutting away this zone around the punched hole, removed the weakness due to the punching.

This experiment being one of great importance it was repeated with plates ·314 in. thick. From the same Terre-Noire plate, bars 2·362 in. wide were cut, in which cylindrical holes, ·708 in. in diameter were formed. Some of these holes were drilled out; in the others a hole ·629 in. was first punched and then enlarged by drilling to ·708 in. Thus there were two sets of bars identical in appearance. The mean resistances to rupture were as follows:

	Tons per square inch.
With the drilled holes	31·29
With the enlarged punched holes	30·17

Other bars cut from a Terre-Noire plate ·472 in. thick gave the following average results:

Table No. X.

	Width of bars.	Resistance to rupture in tons per square inch of original section.
	in.	
Holes drilled to ·669 in.	1·771	34·61
Holes punched to ·669 in.	....	27·76
Holes punched to ·590 in. } Holes enlarged to ·669 in. }	....	33·98
Holes punched to ·511 in. } Holes enlarged to ·669 in. }	....	33·47

It is thus clearly shown that plates from ·275 in. to ·472 in. in thickness, are relieved from the weakening influence of punching, by cutting away the annular zone surrounding the holes for a thickness of ·039 in.

It was of interest to examine this zone carefully. With this object, holes were made of the same diameter in Terre-Noire plates of ·315 in. and ·472 in. thickness, some of them being drilled, and the others punched and enlarged ·078 in. in diameter. The surrounding plate was then carefully cut away in a lathe, leaving the zone in question intact, and by this means rings about ·0196 in. in thickness were obtained (Fig. 17).

In flattening these rings very different results were obtained. The rings from the drilled holes were completely flattened under a hammer without cracking (Fig. 18); but in endeavoring to restore them to their original form they cracked at the extremities (Fig. 19).

The rings formed from enlarged punching were then subjected to the same test (Fig. 20); the first crack appeared when the form, Fig. 21, was attained in restoring the ring to its original form. So far the rings obtained by the two modes were in precisely the same conditions. As to those with punched holes, it was necessary to exert a greater effort to commence flattening them. They could resist only a trifling deformation, and cracks manifested themselves almost immediately (Fig. 22). Figs. 23, 24, 25, represent some of these rings after complete rupture, and it will be observed that each of the fragments forms part of the original circle. It was also remarked that they offered a greater resistance to the action of the file.

Rings with punched holes were also heated in a gas furnace to a cherry red, they were then allowed to cool and subjected to the same test of deformation; all of them were completely flattened (Fig. 26). Cracks appeared however when, after having been flattened, they were brought partially back to their original form (Fig. 27). Other rings treated similarly were cut through, and these could be completely straightened and restored to form; they were then flattened, as shown in Fig. 28, without cracking, but with further flattening the cracks appeared. This last experiment proves clearly that the action of the punch does not produce cracks around the hole it forms. Some authors have accounted for the reduced resistance of punched plates on the hypothesis of incipient rupture.

The Martin plates from Creusot were affected almost exactly in the same way as the Bessemer plates. Strips of Martin steel having one edge cut and the other punched, and exposed to the bending test, showed signs of cracking when they attained the form of which Fig. 29 gives the mean. These cracks appeared almost at the same time on the punched as on the cut side. The strips of Martin steel were ·354 in. thick; those of the Bessemer metal subjected to the same test (Fig. 16) were only ·314 in. thick; taking this difference of thickness into consideration it will be seen that cutting and punching affect both kinds of metal almost equally.

Bars 2·86 in. wide of Martin steel, having a hole punched in the center of each, and broken in the tensile test, showed a mean resistance of 21·87 tons per square inch. Bars of similar width cut from the same plate and with drilled holes gave a mean resistance of 27·70 tons.

In Table No. VII. it was shown that Bessemer steel test bars of the same width showed an average ultimate strength of about 25·26 tons. Other bars from a Bessemer plate and of same width, gave 25·42 tons with punched holes, and 32·58 tons per inch with holes drilled.

According to these figures with a bar 2·36 in. wide, the apparent loss in tensile strength is 21 per cent. for the Martin plates, and 22 per cent. for the Bessemer plates; they may thus be considered as identical.

Rings similar to those already described were cut from Martin steel, and tested under precisely similar conditions as those of the Bessemer metal, and the results were practically the same.

Tempering has a remarkable influence on punched steel plates. The effects were first observed in plates cut like the previous ones from Terre-Noire and Bessemer plates. One side was cut and the other punched. These strips were heated to cherry red, tempered in cold water, and then subjected to the bending test. The first cracks appeared when brought to the form shown in Fig. 30 for the Bessemer plates, and to Fig. 31 for the Martin plates. The cracks were produced as often in the central part as on the punched and cut edges. If these deformations are compared with those obtained after tempering on the planed strips as shown in Figs. 6 and 7, the slight difference between the similar classes of plates will be observed.

Tests of tempered metal were also made on bars 2·36 in. wide cut from the Bessemer and Martin plates, with a hole of ·669 in. in the center of each, some of them drilled and others punched. These bars broken under tensile strain showed resistances of which the following are means:

Table No. XI.

	Resistance to rupture in tons per square inch	
	Bessemer plates.	Martin plates.
Drilled holes	44·50	34·42
Punched holes	42·23	33·34

It will be seen from this that steel punched and sheared and afterward tempered, is brought to the same condition as if its edges had been planed, and the holes drilled.

From experiments made with annealed rings produced in the manner already described, annealing ought to produce a very beneficial effect on the tensile strength of punched plates. This, mentioned already by several authors, was corroborated at Lorient by test bars of Bessemer steel 1·97 in. wide. These bars, after being annealed under the same conditions, gave the following mean resistances:

Table No. XII.

Nature of plate.	Resistance to rupture in tons per square inch.
Punched plates, annealed	29·48
Drilled plates, annealed	29·98
Punched and enlarged, annealed	30·30

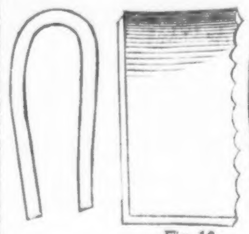

Fig. 16.

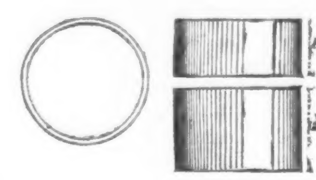

Fig. 17.

Fig. 18.

Fig. 19.

Fig. 20.

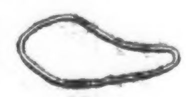

Fig. 21.

Fig. 22.

Fig. 23.

Fig. 24.

Fig. 25.

Fig. 26.

Fig. 27.

Fig. 28.

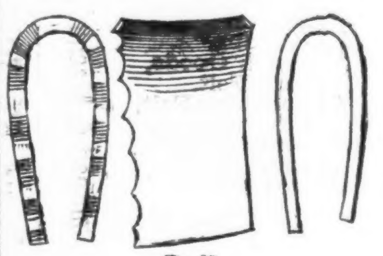

Fig. 29.

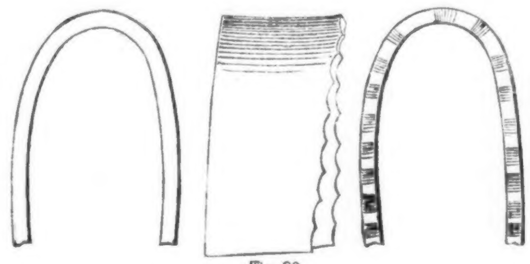

Fig. 30.

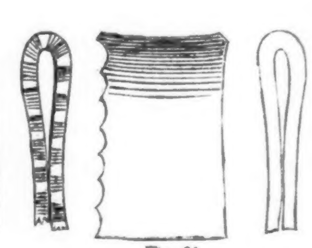

Fig. 31.

Bars cut from the same plate of the same width, and punched without annealing, showed a mean resistance of 24·47 tons per square inch. Thus annealing brought the steel into the same condition as if it had been planed and drilled instead of having been punched.—*Engineering.*

The Monarch of Tugboats.—The San Francisco *Commercial Herald* says: "Probably the most powerful tugboat in the world now rests upon the waters of our noble bay. She certainly has no equal in the United States. The want of such an aid to our maritime commerce has long been felt, and served as an inducement to a number of our enterprising merchants and ship owners to invest a portion of their means for the purpose of rendering the most efficient assistance to all vessels needing the services of a first-class tug. In our issue of July 29th we gave a circumstantial description of the boat and her appurtenances, but on Wednesday, September 8, the owners, and about 250 invited guests, enjoyed a trial trip on the Monarch, around the bay, which resulted to the satisfaction and thorough enjoyment of all on board. In addition to her tugging apparatus the Monarch has been unsparingly furnished with all the appliances for wrecking, and extinguishing fires on shipboard. Her hawsers are 11 and 13 inch diameter, respectively, and she has powerful pumps of sufficient capacity to free a sinking vessel from water, or to flood one endangered by fire. She is also liberally provided with extra life boats and life saving apparatus, and will be constantly kept in readiness to proceed to sea at a moment's warning with a supply of provisions and coal for a full month. We feel a justifiable pride in the possession of so valuable an aid to our maritime commerce." Hawsers 11 and 13 inches in diameter are large ropes—so large that we think our contemporary would do well to send a reporter to measure them again.

A New Mechanical Puddling Furnace.—Messrs. R. Nelson Gere and G. W. Hall, of Syracuse, have conjointly invented and put into successful experimental operation a new mechanical puddling furnace. The mechanism which constitutes the novelty of the invention can, we are informed, be attached to any puddling furnace now in use, and is expected to do away with much of the exhausting and difficult labor of stirring and balling. It consists in the construction of a vessel of peculiar form in the bottom of the furnace, which is so moved by steam power as to keep the metal constantly in motion, uniformly heating the mass and, it is said, very thoroughly decarbonizing it. A furnace of this pattern is now building at the Syracuse, N. Y., Iron Works. We hope to have further accounts of it when in practical operation.

The consumption of petroleum in Japan is very large, and ship loads are received from America. Japan, however, possesses naptha springs in her own territory, and some time since Ischisaka Schujo was sent to Pennsylvania to obtain information relating to the process of production and preparation. His son is still in the States purchasing the necessary machines and perfecting his studies of the subject.

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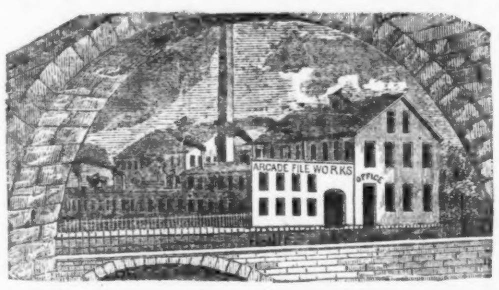

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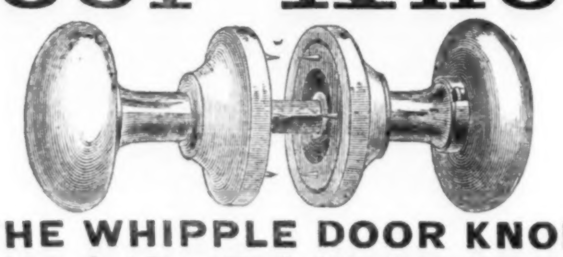

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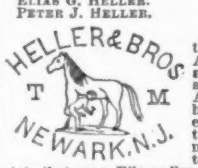

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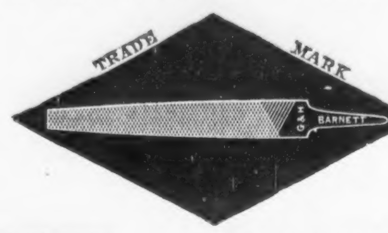

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SEMPLE, BIRGE & CO., Sole Western Agents, } ST. LOUIS, MO.

BUSINESS ITEMS.

NEW YORK.

Weed & Becker's axe factory, at Cohoes, the principal part of which was destroyed by fire, is now rebuilt, the machinery in order, and running day and night to supply the orders that arrived while they were shut down.

Rathbone, Sard & Co.'s pattern room, connected with their stove foundry, Albany, was burned Sept. 18. Loss, from $50,000 to $60,000. Insured.

NEW JERSEY.

At the works of the Screw Reaper and Mower Company, located at Phillipsburg and Raritan, from 160 to 175 workmen are employed in the manufacture of the screw gear reaper and mower, grain drills, horse powers, "telegraph" fodder cutters, and other machines for farmers' use. Of fodder cutters they build five different sizes.

A stock company is being formed at Newark for the manufacture of the Little Giant Chemical Fire Engine. Over 125 shares have been sold at $100 each.

PENNSYLVANIA.

The Chester Edge Tool Works, which have been idle for the past eight months, have resumed business.

Riehle Bros., Philadelphia Scale and Testing Machine Works, have built a large new factory on Ninth street, above Master, to which they are now removing. They will have one of the most complete scale works in the country, with new machinery designed and built at their own works for the manufacture of their patent scales and testing machines and hydraulic work.

Among the noticeable features at the establishment of the Schuylkill Haven Rolling Mill Company is a set of immense scales of 85,000 pounds capacity. The company are at present employing about 60 hands, and turning out about 12 tons of manufactured iron per day, with a capacity for double that amount in busier times. They have a contract for supplying the new chain cable works, just erected in the vicinity, with large quantities of their iron, to be manufactured and welded into chain.

Reis, Brown & Berger, of New Castle, are shipping boat spikes to California.

The Lehigh Valley Spike Works have stopped operations for want of iron, it is said, and Cole & Heilman's boiler works are temporarily idle on the same account.

The Kittaning *Sentinel* says the slag of the Brady Bend Iron Works is being worked over again. The iron is as good as the first run, and the process is remunerative.

MASSACHUSETTS.

The firm of Wm. Allen & Son, at the Worcester Boiler Works, have commenced work on six boilers, to be used for heating the new State Lunatic Asylum. The contract, which amounts to about $10,000, was awarded them in preference to seventeen other builders. The boilers when set will be one of the finest "nests" of boilers in New England, being made of Bay State steel plate, and will be made and fitted in the first-class manner of the manufacturing firm. The boilers will give an aggregate of 550 horse-power, being each 19 feet long and 5 feet in diameter. The steel plate of which they are built is greatly superior to that usually used in boilers, and is well worth examination by any parties using steam.

The Holyoke Machine Company sent some of its paper machinery to France, a while ago, the first of the kind ever used there—and now Martin Lawlor is to go over there to superintend putting it up.

B. M. Couch, of Northampton, is making patterns for an immense emery wheel, 36 inches in diameter and 8 inches thick, which the Northampton Emery Wheel Company are making for the United States Mint in California. In making this wheel a force of 1000 tons, hydraulic pressure, will be used, though the company has facilities for 3000 tons.

The five hundred horse-power Corliss engine in the New England Iron Company's Rolling Mill, at Hyde Park, which is being torn down, and which is one of the largest in the State, has been sold to a firm in Springfield, Ill., for $8000.

Geo. Dunbar, of Pittsfield, the inventor of the patent street lamp extinguisher, has sold the right of New York State for $10,000. The 83 instruments used on the Pittsfield lamps save the town $250 a year.

Only sixty hands are now employed by the Ames Plow Company, Easton. In prosperous times they furnish employment to about 250 men.

The Middleboro' Shovel Works are running night and day to keep up with their orders.

OHIO.

Both of the furnaces at Massillon are out of blast. They have been banked up for a while on account of lack of coal.

The Bellaire Nail Works are running double turn.

The Cleveland Rolling Mill Company are running one of their sheet furnaces with gas obtained from their well, the supply being too small to use it in others. The present supply of gas was found at a depth of from 800 to 900 feet, but the sinking was continued to a depth of 1305 feet, in the hope of finding more, which hope was not realized. The company propose to sink other wells.

Belfont Furnace, Ironton, is still running on Kanawha coal.

The Cleveland Rolling Mill Company manufactured 4500 tons of Bessemer rails, and nearly 1000 tons of wire during August.

The Anchor Iron and Steel Co., Cincinnati, expect to get their financial affairs in such a position as to be enabled, in a short time, to resume operations.

The Dayton Saw Works has recently been supplied with new machinery, and is running full. They exhibited their saws last year at the Southern Ohio Fair and took first premium for all their saws. The present capacity of these works is about $75,000 worth of saws per annum.

The McKinney Manufacturing Co., manufacturers of wrought butts and hinges, at Hamilton, are running their works full, principally upon hinges. They have done a fair business during the present season.

ILLINOIS.

The Chicago Cutlery Manufacturing Company was established in 1868, and has a paid-up capital of $100,000; employs 150 hands, and is selling products to the amount of $200,000 per annum.

The Northwestern Horse Nail Company have recently added a large amount of new machinery to their extensive works in Chicago, one item of which is a new department supplied with their newly patented machines for finishing and polishing the nails, so that every nail is ready to be driven into the shoe, the finished nail being supplied at an advance of only one cent per pound over the unpointed nail. These works turned out the past year 1000 tons of horse shoe nails.

The works of the South Lawn Plow Company, of Chicago, are nearly completed, and the company have commenced operations with a force of 50 men.

Dyer, Lamb & Co., of Chicago, are building a new and extensive foundry and shops at South Chicago. The main or center building is circular, 80 feet in diameter, and in the center of this is a powerful crane with a 40 foot arm, the end of which rests and moves on rollers around on the top of the wall, which is 30 feet high. The cupolas are outside the wall, the metal being discharged within the circular building. Other buildings also connect with this central building. It is intended to be the most complete foundry in the West.

The boiler shops of Peter Devine, Chicago, are having a good run of work, and among all the principal manufacturing concerns of that city we hear of a very encouraging state of business, all seeming to expect a good fall trade.

WISCONSIN.

It is reported that the blast furnace at Iron Ridge is blown out, and in all probability will not start again before spring, if it does then. The company has over 800 tons of iron on the bank, and is shipping no ore. The last sale of iron made was $25·50, five months' time, without interest.

Work is steady in all departments of the Bay View Rolling Mill. The company are putting in machines to make horse shoes, coupling links and pins for railroad cars.

CALIFORNIA.

The Pacific Saw Manufacturing Company, of San Francisco, has now been in operation almost nine years, and opened out a very important mechanical enterprise. The company also manufacture reaper and mower sections, planing knives, curriers' knives, saw mandrels, etc.

KANSAS.

Jefferson county has ordered two new iron bridges from the Leavenworth Bridge Company.

The Moral Influence of a Church Bell.

An enterprising firm of dealers in bells are advertising their wares in a novel and original manner. We quote the following real little essay on the moral influence of church bells, from an advertisement which we find in an exchange:

"Many of our feeble churches now without a bell, would use every effort to procure one, did they fully appreciate its value as a *church help.* The church is nothing except it gather together the people within its walls; and no material agency effects this assemblage so much as a bell on the church. Its first ringing on Sunday morning announces to the people that service is surely set for that day. It stirs them up to make ready and be in season when the worship begins. It serves as a general invitation to all within hearing to come to the house of God. Each one feels himself solicited by its loud calls. The stranger who may have just entered the place to settle, and the stranger stopping at the hotel, as well as the members of the church, count themselves to be welcomed by its cordial tones.

"The bell also serves to awaken the consciences of some in whom the habit of church-going has become weak. To those who do not know the location of the church, it declares the way—to those who would forget the hour of service it points the time. It is, in fact, the general voice of mother church herself, to the world without, exhorting them to attend her courts.

"There is many a country church whose half empty seats are largely owing to the want of a bell to declare its existence and locality. There is many a struggling congregation whose weakness and troubles would quickly disappear if they would raise a bell to ring the mass of the people together. For want of such a proclamation, the world often knows nothing either of the church's presence or its place.

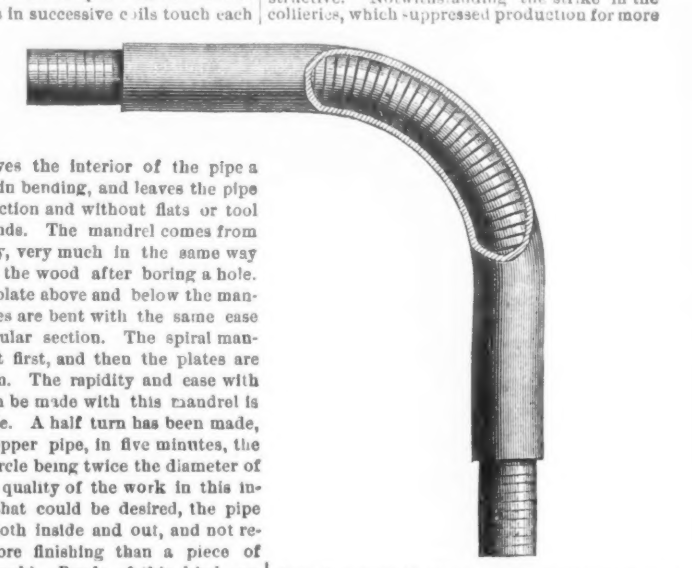
"All the people of any town have an interest in owning a church bell. They need it for funerals and weddings, for days of rejoicing and for national celebrations. It may ring for a fire and prevent a conflagration. In short, a church bell is a possession and a treasure to the whole community in the midst of which it is placed."

The St. Louis Bridge Company.—The Circuit Court, at St. Louis, has issued an order relative to the payment of interest on the first mortgage bonds of the St. Louis Bridge Company. According to its stipulations, the receivers are to provide for the payment of the interest due Oct. 1 by borrowing such money as is necessary over the amount already in their possession applicable to this demand, at any rate of interest not exceeding 7 per cent. per annum. For the money thus borrowed, the receivers are authorized to pledge the net receipts that come into their hands after the payment of the necessary expenses attendant on the operating and preserving the bridge and the payment of taxes, and any notes that may come due for which real estate of the company has been pledged as security.

Flexible Mandrels for Bending Metal Pipe.

Every one who has had experience in putting up any kind of work in which bent pipes or tubes are used, knows the great difficulty and expense of making bends in pipes. The time required to make a bend, and hammer and file it smooth on the outside, adds very greatly to the expense of work in which bent pipes occur. The methods commonly employed is to fill the pipe with sand, rosin, or some fusible metal, stopping the ends to prevent the material from escaping, and then make the bend, hammering to preserve the pipe round and to take down wrinkles. With lead and iron pipes it is sometimes customary to fill with sand and bend by the use of a roller and curved groove, in which the pipe is laid. This, though not very expensive, is rather unsatisfactory, because the pipe is generally badly flattened and often destroyed entirely. Bends in iron pipe, when they are very short, or when they comprise a good portion of a circle, are awkward to make, and when made the pipe is very frequently found to have lost a good portion of its strength by reason of kinks, wrinkles, and the stretch of the metal.

Quite a number of inventors have attacked this problem, but they have not been very successful. The flexible mandrel, which we illustrate this week, the invention of Mr. Morris L. Orum, of Philadelphia, seems to give a satisfactory solution of the difficulty. It consists of a spiral spring, made from square wire and coiled so that the wires in successive coils touch each



other. This gives the interior of the pipe a perfect support in bending, and leaves the pipe with uniform section and without flats or tool marks in the bends. The mandrel comes from the pipe readily, very much in the same way that a bit leaves the wood after boring a hole. By using a flat plate above and below the mandrel, square pipes are bent with the same ease as those of circular section. The spiral mandrel is taken out first, and then the plates are easily withdrawn. The rapidity and ease with which bends can be made with this mandrel is quite remarkable. A half turn has been made, in a $1\frac{1}{4}$ inch copper pipe, in five minutes, the radius of the circle being twice the diameter of the pipe. The quality of the work in this instance was all that could be desired, the pipe being smooth both inside and out, and not requiring any more finishing than a piece of straight pipe would. Bends of this kind can be made at any point in a pipe with the same ease as at the end. If a bend is to be made in the center of a long length of pipe, a short spring is placed on the end of a key of proper length; it is then pushed in to its proper place and the bend made, when the mandrel and key are withdrawn in the usual manner. One of these bends, such as we have described, would take a coppersmith nearly an hour to do and finish in the same style. In fact, the work can be done in about the same time it would take to fill the pipe with rosin preparatory to bending. In filling a pipe with rosin or lead much time is lost in waiting for the material to cool, and after the bend is made time is required to melt the rosin or lead out of the pipe and insure a clean bore. Mandrels are at present made for bending pipe up to 5 inches in diameter, and this size is in course of preparation. The operation of bending is a very simple one, the mandrel being inserted with a key into the pipe at the proper point, and the pipe bent around a grooved block by means of a press or by hand, according to the kind and size of pipe. We have seen samples of copper, tin, and sheet zinc pipes bent in very short turns by this process, which were exceedingly perfect in all respects. The inventor's address is Morris L. Orum, 702 Chestnut street, Philadelphia, care of J. Snowden Bell, attorney.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Sept. 27, 1875.

The week just closed has been one of decided activity in business circles, almost all branches showing more activity than at any previous period this year. In pig iron, your market reports for this week will show, doubtless, larger transactions than have been noted as yet for any one week since the panic, while the least that is said about prices the better. Rumors are current on the street that the proposition of the Reading Coal and Iron Company to the furnaces, to furnish them with stock and take the product, has been withdrawn on account of the small number of furnace owners accepting the terms. As I have not had an opportunity to verify this officially, I give it for what it is worth, and in the belief that it is true. Whether so or not, the effect of the proposition in the pig iron market has been patent to all, and quite as decided as if it had been purposely done to depress prices, which there is no reason to believe. The increased sales are in part due to the usual desire of consumers to stock up before close of navigation; in part to the favorable concessions made by holders in order to get rid of their metal before the market was further weighted with heavy stocks. Whatever may have been the cause, a few weeks of such transactions as have marked the last would soon clear out the accumulation of stocks, and have the furnace banks free for next winter's production.

The general business of the West is reported to be very good, and telegrams from Chicago report last week's trade to have been the largest ever done in that city. All the theories of finance, so freely bandied, the clamors for a change of currency or a change of administration, the diatribes against a hard or soft currency, and the platitudes about want of confidence, melt into nothingness, under the presence of the possession of something to sell, which the world wants. Panics have come under specie payments as under currency rules, under Democratic as under Republican regimes, and the history of the past only serves to show that no particular or especial political or financial principles will avert them. They work their own cure by enforcing economy, thrift, settlement of debts, curtailment of undue credit, and greater caution in trading, and are invariably succeeded by seasons of prosperity, only in turn to reproduce themselves from the original and inherent causes. But when it is an ascertained fact that Great Britain will require, this year at least, 90,000,000 bushels of grain for breadstuffs, and that this country has a very large surplus to export, and is in a better position to supply the British shortage than any other country, we have the something the world wants, and our trade revives, the effects of panics disapper, and all the theories of what can or cannot, should or should not be done, melt under the application of the logic of facts. In connection with this matter, the Chief of the Bureau of Statistics issues some figures which support the views here taken in the imports and exports of merchandise for the month of August and the eight months of the current year. The imports of merchandise for the month in 1875 show a decrease of about $1,000,000 from those of August, 1874; but those of the eight months closed with August, 1875, are nearly $36,000,000 less. Our *exports*, however, for the eight months show a decrease of nearly *sixty millions*. These figures indicate more clearly than anything else can the effect of panic upon the business of the nation, and a comparison of them with the increase to be expected at the close of December will show the revival of our export trade. The figures of the coal product for the year are curious and instructive. Notwithstanding the strike in the collieries, which suppressed production for more than five months, there is only a reduction of 745,563 tons in the eight months of this year. In other words, the miners to make up for the lost time of the strike, have been doing fair work, and have shown that they can take out in three months all that is needed to supply the market. What this will result in remains to be seen—either production will be stopped and wages with it, or coal must be cheapened and demand increased. It further shows, however, that the coal companies, and through them, the public, have been paying for a great deal of work that never was done, and the effect upon the miner in any case is likely to be either a reduction or entire stoppage. Practically the first result will be the breaking of the combination, sharp competition in prices of coal and a benefit to consumers.

In a late letter I noticed the proposed trial of the Baxter steam street car by one of our suburban horse roads. This trial has resulted in complete failure; not, indeed, from any inherent fault of the steam car, but from bad construction of the road itself. The difficulty encountered consisted of the shortness of the curves of the track as laid under direction of the city engineers. Both horse and steam cars experience like difficulty in rounding these curves, the obstacle being, of course, worse with the locomotive. The trial terminated with an accident to the engine, but is not considered as indicating anything, either for or against, steam traction on city railways. But it leaves the question still undecided and open.

An improvement in that class of stoves having open grate fires has lately appeared, and is a veritable novelty. This is the addition of a bright nickel-plated plate suspended over the fire and moved by a crank passing through the side of the stove. While the fire is being kindled the plate is turned perpendicularly toward the front, which prevents it from being smoked; but after the fuel is fairly ignited the plate is turned back at an angle of 45 degrees, as indicated by the wheel on the side of the stove. The reflection gives the appearance of a double fire, and adds much to the cheerfulness of the stove, while the refraction gives additional heat, and apparently the greatest from the plate, as it is felt instantly at the opposite side of a large room. There is a clear gain in heating power obtained, since the heat rays are reflected into the room, while the rush of air usually passing up the chimney of an open stove is checked and thrown down on the fuel, producing surface combustion, while the draught at the base may be shut off, giving a clear, bright fire, without extravagant consumption of fuel.

A new bronze statue has just been completed at the works of Messrs. Robert Wood & Co., and exhibited previous to being shipped to Boston, where it will be erected on Commonwealth avenue. The subject is Gen. John Glover, a native of Salem, Mass., and a revolutionary hero. The statue was ordered by the late B. Tyler Reed, of Boston. The artist was Martin Milmore, a young sculptor of remarkable success, at present in Rome. The figure is colossal, and represents the hero in uniform, and the pose is easy and natural. The details of the casting show, however, that the firm of R. D. Wood & Co. are steadily progressing in their specialty, and produce work fully equal to that done abroad.

The city councils have finally passed the ordinance vacating certain streets for the completion of the Philadelphia & Reading Railroad Company's ship yard and dry dock. The work will be at once resumed and the dry dock erected, while the construction of iron colliers will give work to many mechanics. The company is now experimenting in the use of pea coal under the boilers of marine engines, and so far successfully. If attained, this will reduce the cost of fuel to ocean steamers full one-third, and is highly important.

The telegraph announces the failure of Glass, Neely & Co., Keystone Iron Works, Pittsburgo, with liabilities of $310,000 and assets of $350,000, the latter principally in mill building and real estate. This firm was formerly Wilson Glass & Co., and are rolling mill proprietors strictly.

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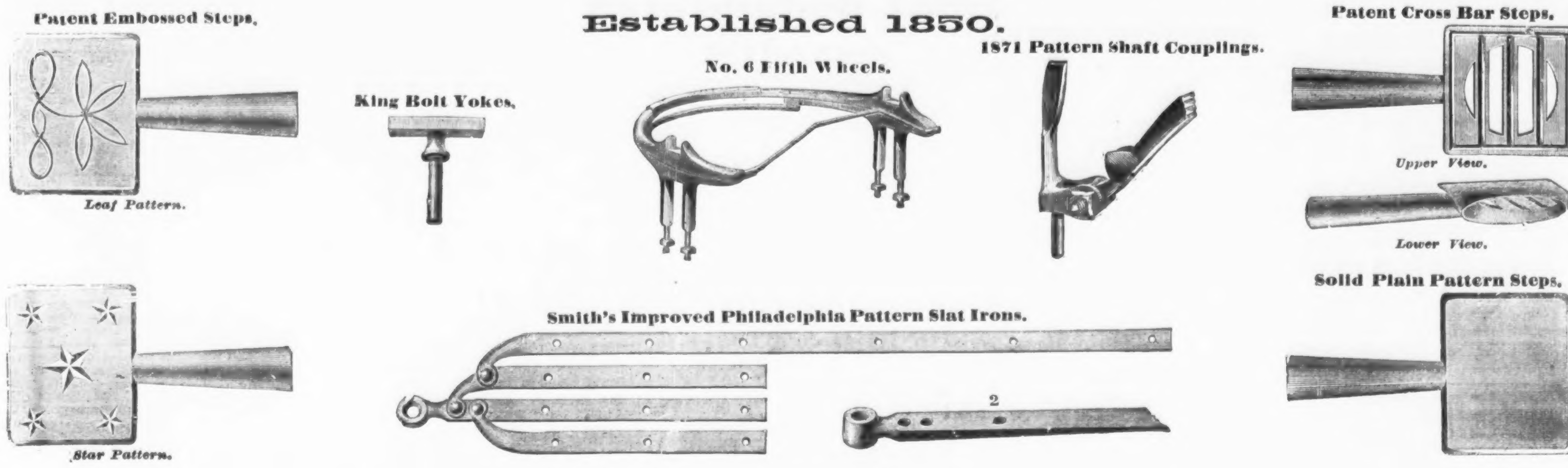

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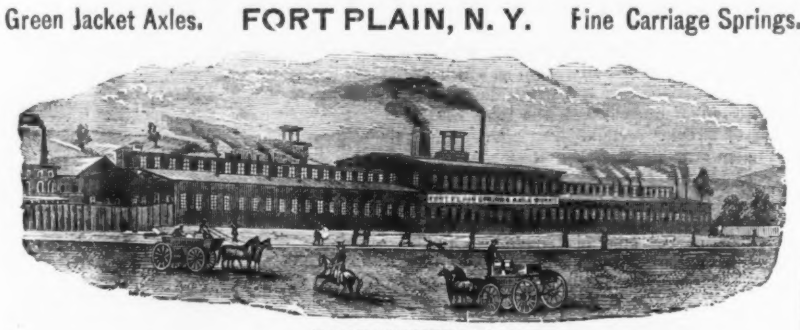

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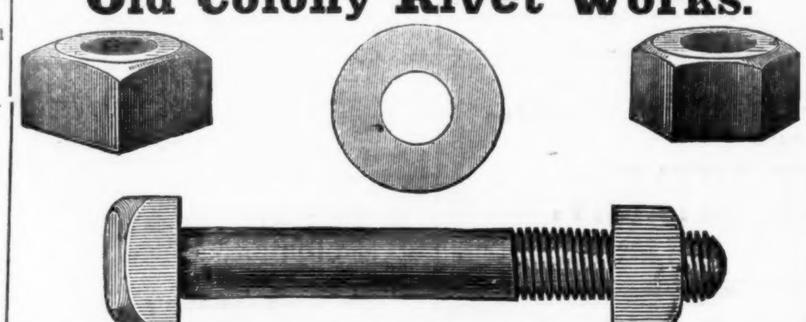

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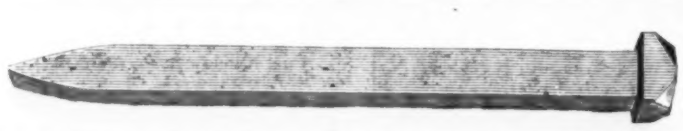

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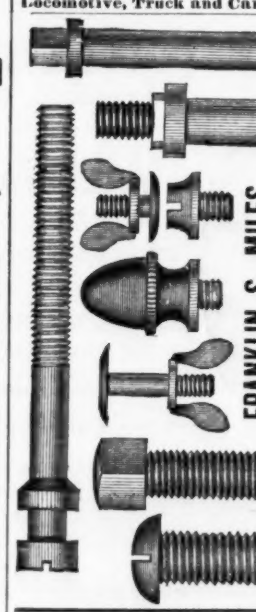

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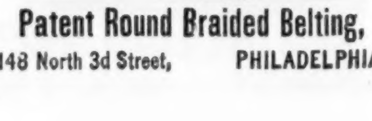

Patent Round Braided Belting,

148 North 3d Street, PHILADELPHIA.

The Iron Age.

New York, Thursday, September 30, 1875.

DAVID WILLIAMS - *Publisher and Proprietor.*
JAMES C. BAYLES - *Editor.*
JOHN S. KING - - *Business Manager.*

CONTENTS.

Dr. Lardner and Ocean Steam Navigation.

Dr. Dionysius Lardner, one of the most clear-headed and practical of the scientific men of the last generation, has been as much laughed at without cause as any man who ever lived. Whenever the newspaper writer, the popular lecturer or the average preacher wants an illustration of the fallibility of scientific calculations, he gives us the old story of how Dr. Lardner, in 1838, entertained an audience in this city with a scientific demonstration of the impossibility of crossing the Atlantic with a steamship, and how his audience left the hall just in time to hear the newsboys cry an extra announcing the safe arrival of the "Sirius" and the "Great Western." The story is a very interesting one and has done good service; but it is open to the objection of being untrue in every particular. Dr. Lardner never either demonstrated or asserted that ocean steam navigation was impracticable, and nothing of which we have any record in the history of early steam navigation, in any respect contradicted what he did say.

Dr. Lardner's lectures and writings on the subject of steam navigation, which are cited by these people so frequently, were of the nature of calm, logical discussions of the practical aspects of steam navigation. His inquiry was devoted to the question of whether it was possible to make long steam voyages commercially profitable, and not whether such voyages were possible. Had it been otherwise he would have been a much greater fool than he is commonly supposed to have been, for the reason that long steam voyages had been made and he knew all about them. He knew perfectly well that at the time of his writing a profitable steam service was maintained between London and Bombay. It was, moreover, upon the results attained in the steam service between England and the further Mediterranean ports, in which the best steamers then built were employed, that he based his calculations of the relation of cost to profit in transatlanic steam voyages. To show that he was regarding the venture from a strictly commercial standpoint, we quote the following from the much ridiculed lecture: "To form an approximate estimate of the present powers of steam navigation, it will be necessary to consider the mutual relation of the tonnage, weight and power of machinery, available stowage for fuel, average speed in all weathers, as well as general purposes to which the vessel is to be appropriated—whether for the transport of goods and merchandise, or merely of dispatches and passengers." To further show that he knew what he was talking about, we quote as follows: "In testing the practicability of the project here contemplated, it is clear that the worst average must be assumed." The average included weather, wind, speed, and all the conditions which tended to lengthen the voyage. We quote further: "The Mediterranean steamers are capable of taking a quantity of fuel at the rate of 1¼ tons per horse-power, but the proportion of power to their tonnage is greater than that which would probably be adopted for longer runs. We shall, therefore, perhaps be warranted in assuming that it is practicable to construct a steamer capable of taking 1½ tons of fuel per horse-power. At the rate of consumption just mentioned, this would be sufficient to carry her 3000 miles in average weather; but, as an allowance of fuel must always be made for emergencies, we cannot suppose it possible for her to encounter this extreme run. Allowing, then, spare fuel to the extent of one quarter of a ton per horse-power, we should have as an extreme limit of a practicable voyage, without necessary relay of coals, 2500 miles." This he considered the lowest of a profitable direct voyage. To show how careful and accurate his estimates and opinions really were, we have only to quote further from his remarks on the greatest economy which had been attained: "We may, perhaps, be justified in assuming that, when this good stoking and all other practicable means of economizing the coal shall have been practised, the actual consumption will be reduced to eight pounds per horse-power per hour." Further along we find: "In some cases, * * * taking the engine as working for 22 hours per day, on an average, * * * the daily consumption may be reduced to 176 lbs. of coal per horse-power." This was, practically, as good a result as the average commercial steamer of that day could be expected to give. How enormous these figures are may be seen when we state the fact that, at this rate of consumption, it would take 176 tons per day to supply one of our largest steamers for twenty-four hours, or over 1700 tons for the voyage across the Atlantic. The actual consumption is often at or below 50 tons per 24 hours. Speaking of those who at that time were planning to make the "unbroken voyage" from London to New York, he says: "Seeing, then, that the geographical position of the points proposed to be connected with the atmospheric phenomenon place such a voyage beyond the present limits of steam navigation, prudence suggests, at least, until these powers acquire some extension, that we should consider whether and by what means the contemplated route may be resolved into voyages of more practical length." Here, again, he refers only to the commercial practicability of such voyages, and not to the question of whether it is possible to make them or not. If there is any doubt on this point the following passage should set it at rest:

"But with so great a prize in view * * * can it be doubted that * * * British genius will not soon extend the limits that slight degree beyond their present limit which will be sufficient to render the proposed voyage, under all circumstances of the case, practicable and profitable?" He then went on to explain the conditions of the voyage if landings were made on the Irish coast, and on the American coast as far East as practicable, and points out the fact that by this means the voyage could be made in such steamers as were then built. Now let us see how the facts in the case bore out the Doctor's statements. The Sirius, Great Western, and other steamers which were put on to run direct, were soon withdrawn. The voyage was not only unprofitable, but absolutely ruinous. The wreck of the Great Western doubtless did much to cripple the company which built her, but there was emphatically no money in running steamers to America, and it was not until a coal station was established on the Eastern coast of Halifax, the consumption of fuel greatly reduced, and the speed of ocean steamers increased one-half, that steam communication between England and America became practicable or profitable. If we remember rightly, it is only about fifteen years since Halifax was abandoned as a coal station, and the run made from side to side without coaling on the way. This was accomplished by the more economical engines which brought the consumption of coal down from 176 tons to 50 tons, and increased the speed from 7½ miles per hour to 15 or 16. In other words the very extension of the limits of economy that the Doctor asked for are those which have made the long voyage "practicable." Had the early companies listened to his suggestions, it is possible that the voyage might have been made a paying one, but instead of doing so the ships were burdened with an enormous amount of coal, sufficient for the whole voyage. Freight was of course out of the question, and passengers and mails were only to be relied upon as sources of revenue. Their speed was not great enough to compete with fast packets, and the vessel was not economical enough to carry passengers at packet prices, hence the number of failures in this traffic. Our own "Collins Line" failed on account of the enormous quantity of coal carried, and the great weight of the old fashioned engines used, together with the fact that the ships were driven at comparatively high speeds. In other words, they literally fulfilled Dr. Lardner's predictions made years before. Transatlantic steam service was not practicable until the boats were made more economical of coal and power. Not one of the old Collins line has her engines in her now, though they were most of them running as sailing vessels until quite recently.

We think these quotations of Dr. Lardner's own words are a sufficient vindication of his reputation as a clear headed and eminently practical man of science. But he deserves a little more than this. Though wholly ignorant of the fact deduced by Scott Russell from more recent experiences, that to be economical a ship's burden must equal one ton per mile of the voyage she is to make, Dr. Lardner recommended the employment of vessels from ten hundred to twelve hundred tons burden, which was much larger than steam vessels were commonly built at that time. His reasons for making this recommendation are evidently to be found in a recognition of the necessity for giving steamers as large a capacity as possible, in proportion to the horse-power of their engines and the weight of and space occupied by their machinery, coal, etc. Futhermore, he saw and proclaimed the advantages of iron over wood, and in one of his lectures, after summing up the advantages of iron hulls he says: "For sea voyages they offer many advantages." We thus see that Dr. Lardner, instead of making a fool of himself and of science, was conspicuously exact in his estimates and predictions. The moral of all this is easily drawn, and we commend it to thoughtful consideration of the newspaper writers, popular lecturers and others, who have made Dr. Lardner's memory a by-word and a jest. It is: Before you quote a man's words to laugh at them, and especially before you use them as showing that scientific estimates are of little value as compared with practical results, it is well to find out what he said, and how far his statements agreed with the facts of the case.

Comparative Safety of Travel on English and American Railroads.

We have lately had occasion to draw some comparisons between British and American railroad practise not altogether favorable to the former. The impression remains in the public mind, however, that travel on British railroads is attended with less danger than upon American lines; and this assumption is made good use of in answer to a criticism of the English railway system from an American standpoint. Let us see, so far as available statistics will permit, to what extent this assumption is warranted by facts. In the United Kingdom, during the past year, 2425 persons were killed and 5050 injured; a total of 7475. Taking the best available records of accidents for the United States we find that there were 204 persons killed and 975 wounded for the year ending with August, 1875. These are only the accidents that are of a nature sufficiently serious to be reported. In the number killed, however, they are practically correct. In some of the States the returns are kept with a considerable degree of accuracy, and some of these are available at the present moment. In the State of Pennsylvania the number of passengers carried was 42,297,158, the number killed in this time was 16, and 93 were injured, or one person killed among 2,643,572 passengers. In England the rate was 1 in 360,000 and a fraction, or almost 12 times as many as in the State of Pennsylvania. In Scotland 38,000,000 passengers were carried and 211 persons were killed, or 4,000,000 less persons carried than in Pennsylvania and 195 more persons killed. On the Pennsylvania Railroad 6,088,103 passengers were carried and one person killed. This passenger was found dead on the track, and it is probable that he fell from the platform of a car, where he was standing contrary to the rules of the company. In this 6,000,000 of passengers only 18 were injured. At this rate there would have been but 70 passengers killed in England during the year, instead of 1175, and instead of 4468 persons injured there would have been only 1260, or a trifle over one-fourth as many.

Another railway company, not particularly noted for safety, carried 4,000,000 passengers during the year, and killed only one. The Philadelphia and Reading Road carried 6,900,000 passengers, and killed two. On investigation it was found that the passengers killed and injured were violating the rules of the company, and so by their own acts were responsible. On some ten different roads no passengers were killed during the year, although the number carried on them was very large.

In the United Kingdom there were some 1275 accidents reported during the year, among which we find no less than 229 from broken axles. From averages which we have made we think this about five times as many as were reported in this country. There were 68 failures of wheels and tires, which we think very much larger than here. With these facts and figures in mind, it is evident that the admitted superiority of British permanent way does not secure as great an immunity from accidents to trains as that resulting from better rolling stock and better management in this country. Were American trains no better provided with brakes, in proportion to their weight, than the English trains, travel by rail would become so hazardous that few would venture it who could travel by any other method, and the immense traffic on our trunk lines would be subject to serious and constantly recurring interruptions. We have much to learn from English engineers, perhaps, but not a great deal about railroads or their management.

The Influence of Stagnation in the Building Trades on the Lead Market.

The course of the lead market in this country, as compared with that of Europe, has been a great disappointment since last spring. There was not, we think, much expectation of a great activity in the building trades; few were prepared for the extreme dullness which has prevailed during the past half year. This has no doubt resulted in great degree from the downward tendency of the real estate market and the unsettled price of rents and the general effects of the late panic, which are most seriously felt in communities which, in times of greater prosperity, are most enterprising and progressive. The effect of this very general suspension of building operations has been to steadily diminish the demand for lead pipe and sheet lead, so much so that the spring trade in these classes of goods amounted, practically, to very little. In a great measure, the sale of white lead has suffered from the same causes. This condition of affairs has continued pretty much throughout the summer, and it was hoped the beginning of the fall trade would witness a brisk recovery in the lead market. Up to the present time, however, these expectations have not been realized, so far as the trade of this market is concerned, but there is still some prospect of greater activity as the season advances.

But while this is true of New York and the other principal markets of the Atlantic coast, it is a noteworthy fact that the distributive trade of St. Louis is steadily increasing and gaining in importance. The development of the great lead producing districts of Missouri, Colorado and Utah, has resulted in a very important diversion of trade. Large quantities of lead which capital formerly drew to New York and other seaboard markets, to be distributed throughout the country, including a good part of the West, are now shipped direct to the principal markets of the interior: And with the accumulation of capital and the extension of railroads in the West, St. Louis and other Western cities have deprived New York and the East of the control of a large share of the lead trade of the country. Another theme not to be overlooked is the growing importance of the soft lead of Missouri for the manufacture of white lead. Under normal conditions, the United States consume about 45,000 tons of white lead annually. The distribution of the greater part of this amount is shared by the various commercial cities of the country about as follows:

	Tons.
New York	13,000
St. Louis	9,000
Pittsburgh	6,000
Philadelphia	6,000
Cincinnati	2,000
Louisville	1,000
Boston	1,000
Baltimore	1,500
Buffalo	800
Cleveland	800
	41,100

The remainder of that manufactured and consumed in this country is made in small establishments in places of too little note in connection with this industry to be separately mentioned. From domestic sources we can supply to the manufacturers about 20,000 tons of soft lead. Should the requirements of the trade exceed this amount we shall probable have to import enough to meet the balances of our consumptive requirements. This, however, is not likely to be necessary. The consumption of white lead has so fallen off that the Missouri product of soft lead will probably be sufficient this year. A larger requirement may confidently be expected in the spring, and in the meantime we may hope for a decline in the foreign markets or an increase in the Missouri production.

The course of the lead market in Europe has been mainly influenced by the enormous war demand. With no immediate prospect of war, all Europe is arming on a scale of vast preparation. There is also a good consumptive demand for lead to be employed in the arts, and as the result the price of lead is higher now than it has been at any time since the outbreak of the civil war in Spain. We may safely conclude, therefore, that rapid as has been the increase of American lead production, it is by no means excessive, and that we shall probably find use for all we can make as soon as we shall have recovered our normal commercial and industrial activity. From present appearances we conclude that next spring will witness a marked improvement in the lead markets.

The Advance in Tin.

Notwithstanding the heavy shipments of tin from the Straits and Australia, amounting to 13,320 tons for the first eight months of the current year, as compared with 8721 tons for the same period of last year; making the total import at London 14,890 tons, against 11,568 last year, the European markets have been steadily improving, under the influence of large deliveries, which, of foreign tin at London alone, amounted to 11,908 tons, against 8769 tons last year. An examination of the statistics of stock and amounts afloat will assist in explaining the situation, and in forming an opinion with regard to the immediate future:

STOCK OF TIN IN EUROPE.

	Aug. 1, 1875. Tons.	Sept. 1, 1875. Tons.	Sept. 1, 1874. Tons.	Sept. 1, 1873. Tons.
Banca warrants	897	385	330	690
" Trading Co.	2,405	2,689	4,460	4,180
Billiton	858	652	825	490
Straits and Australian at London	5,566	5,717	2,755	1,884
	9,726	9,443	8,370	7,244

AMOUNT OF TIN AFLOAT FOR EUROPE.

	Aug. 1, 1875. Tons.	Sept. 1, 1875. Tons.	Sept. 1, 1874. Tons.	Sept. 1, 1873. Tons.
Banca	1,114	1,109	375	882
Billiton	1,000	1,000	375	520
Straits	1,040	532	425	420
Australian	1,393	1,480	800	..
	4,547	4,121	1,975	1,822

From this it will be seen that the stock in Holland on the 1st of September, dwindled down to 3726 tons, as compared with 5615 tons in 1874 and 5360 in 1873, whereas the stock in England has increased to 5717 tons against 2755 and 1884 in 1874 and 1873 respectively. The increased quantity afloat for Holland somewhat lessens the strength of the position of that market. This amounts to 2109 tons, against 750 and 1402 at corresponding dates of the two previous years; while the amount afloat for England was 2012, against 1225 and 420. With an excess in stock this year over last of only 1073 tons, and 2199 in excess of 1873, the quantity afloat exceeded that of last year by 2146, and that of 1873 by 2299. The aggregate visible supply was 13,564, against 10,345 and 9066 in 1874 and 1873. Taken as a whole, therefore, the statistical position of tin was by no means strong, and much of the recent improvement in prices will have to be traced to the following causes: 1st. The general upward tendency of metals

in Europe. 2d. The belief that tin has been depressed below its intrinsic value by speculative manipulations. 3d. The remarkably large amount delivered for consumption. 4th. The belief that the Australian production this year will not exceed that of last. From all that can be learned of the statistical position of the metal, however, it appears that the future of prices depends more upon a continuance of the large consumptive demand than upon any impulse which may be given to shipments. Whether these elements would remain favorable to holders in the event of a further rise, may be considered doubtful, and we would do well to be prepared for a notable recoil in prices should there be any unfavorable change in the general condition of the trade. In our own market some large speculative purchases have been lately made, and the market is now about 1 cent, gold, per pound higher than a week ago, sustained by the fact that the available and expected supplies are moderate.

We have just received information from a trustworthy source that the Pacific Mail steamship City of Tokio, on her last trip from Yokohama to San Francisco (4650 miles), accomplished the distance in 17 days 12 hours. A copy of her log, forwarded to New York, shows that the steamer at no time used more than half of her boilers. She is fitted with ten, and used only five. The average time made was 11 knots per hour. The weight of cargo brought was 4000 tons, and the consumption of coal was one ton to 100 tons of cargo carried. The City of Tokio on the water line is 395 feet long by 48 wide, she is 38 feet deep from the spar deck, and she "loads," on the average, 50 tons to the inch. This steamer has been almost as much abused before the public as the City of Peking. One of her principal officers, in a private letter, says she is as good as when she left New York. If there be any foreign steamship whose record is as economical as that of the City of Tokio, as above given, we should be happy to have the fact communicated to us.

Commencement day orations are usually very dry stuff, but one of the graduates of Bowdoin the other day made an uncommonly happy hit by entering "a plea for a shortened yardstick," in which he set forth the innumerable advantages which would result from an act of Congress declaring that the legal yardstick should henceforth be 30 inches long, instead of 36. It was "conclusively shown" that by this policy of shortening the yardstick, Congress would at once add immensely to the productions and wealth of the country, would start the wheels of business, provide labor for the unemployed, give cheap cloth to the poor, and in general promote virtue and godliness. Those who are advocating the unlimited expansion of the currency as a means of bettering the condition of the productive and distributive industries, would do well to adopt the idea of the shortened yardstick. The arguments employed to set forth the advantages and benefits of an irredeemable currency depreciated by unlimited dilution, cover the case of the shortened yardstick perfectly.

The little "vacation" of the mill operatives at Fall River, Mass., which began with so much eclat early in August, is ending just as any man with a grain of common sense must have foreseen. Unfortunately for the strikers, the question between them and the mill owners has assumed the aspect of a direct issue between the trade unions and employers, the result of which will determine whether manufacturing shall be controlled by labor or capital. There can be no question as to the result of the contest. Resolutions to starve before going to work under an agreement which protects the manufacturers from the unwarrantable interference of irresponsible committees, are all very well, but the majority who are willing to return to work will not long be deterred from doing so by a turbulent minority, led by self-seeking and dishonest demagogues. The unions will be broken up, and after great and unnecessary sacrifices the operatives will resume work without having gained a single important advantage.

We publish in another column an interesting letter from a correspondent writing from Ironton, Ohio, describing the practical results thus far attending the operation of the new Ferrie Self Coking Stacks and Whitwell Hot Blast Ovens of the Etna Ironworks, and new stack of the Ironton Iron and Steel Company. The letter will be found to contain much specific information, and will be read with pleasure by all who have felt any interest in the success of the experiments which promise so much for the future of the iron trade of the West.

The Use of Caustic Lime in Blast Furnaces.

The following is a paper read by Mr. Isaac Lowthian Bell before the Iron and Steel Institute, at Manchester, on the 8th instant:

In a furnace about 48 feet in hight, the carbonic oxide generated by the combustion of the coke at the tuyeres, arrives at the throat so speedily that it, with the accompanying gases, leaves the orifice of the structure at a comparatively high temperature. The solid contents filling the furnace, as a consequence, are within a few feet of the charging plates, in a state of bright incandescence.

When limestone, in its natural state, is used as a flux, it quickly reaches, in such a furnace, a zone where the heat is sufficient to separate the carbonic acid from its calcareous base. The temperature of this region, indeed, is so intense, that not only the carbonic acid associated with the lime, but a portion of that due to the deoxidation and carbon impregnation of the ore, is reduced to the form of carbonic oxide.

I have shown, on a former occasion,* that the smelting of a ton of iron is probably accompanied by the conversion of 6·58 cwts. of carbon from the state of carbonic oxide to that of carbonic acid. The carbon in its acidified form in the quantity of limestone consumed, upon one occasion, in a 48 feet furnace, was 1·92 cwt. Hence, we may infer that, were there no reduction of carbonic acid to a lower condition of oxidation, we ought to find, for each ton of iron produced, 8·50 cwts. of carbon, combined with its maximum dose of oxygen.

Instead of this quantity only 5·47 cwts. of carbon so oxidized was found in the escaping gases of one of the smaller furnaces referred to, per ton of iron of its make.

This change in the composition of the escaping gases of a blast furnace involves more serious consequences than what, perhaps, at first sight might appear.

	cwt. units.
There is the heat absorbed by splitting up carbonic acid containing (8·50—5·47) 3·03 cwts. of carbon	9,696
The decomposition of this carbonic acid carries off the same weight of carbon which it contains and which escapes combustion of the tuyeres, involving a further loss of	7,272
	16,968
To which has to be added the heat required for expelling the carbonic acid from 16 cwt. of limestone	5,920
	22,888

The coke consumed upon the occasion which furnished these data amounted to 28·92 cwts. per ton of iron, and the heat estimated to be afforded by its combustion, using air heated to 452° C (846 F.), was 104,012 units. The proportion, therefore, of the total heat generated, which was absorbed by the expulsion of carbonic acid from the limestone, and the decomposition of this compound of oxygen and carbon amounted to 22 per cent. Of this, 16 per cent. is due to the use of limestone, and 6 to the dissociation of the carbonic acid, produced by the reduction and carbon impregnation of the ore.

An expenditure of 16 per cent. of the heating power of the fuel, which is rendered necessary by the presence of one of the constituent parts of our flux, affords *prima facie* a strong reason why we should seek to relieve the furnace of a duty represented by about 4¼ cwts. of coke, particularly as half this weight of inexpensive small coal sufficed for the purpose of the lime kiln.

I am not aware that the experience of any iron smelter justifies the belief that any approach to this economy was ever realized by the substitution of lime for limestone. On referring to the Clarence furnace books, I find, when using the same quality of coke in each case, one of the smaller furnaces (48 feet) gave the following results:

14 days' make. Tons.	Av. No.	Coke per ton Cwts.	Mine yielded	Cwts.
419	3·34	29·06	41·9 pr ct. lim'st'ne pr ton.	14·53
444	2·20	29·04	42·6 " burnt lime "	11·14

Other examples from furnaces of similar dimensions gave the following averages:

14 days' make. Tons.	Av. No.	Coke per ton Cwts.	Yield per mine.	Cwts
404	2·65	29·31	42·0 pr ct. lim'st'ne pr ton	15·89
451	2·10	27·99	42·6 " burnt lime "	11·46

In the first two cases given, the consumption of fuel is practically the same, but the produce of the ironstone (Cleveland), when smelted with calcined limestone, is somewhat better. Discarding this cause of difference, the sole advantage from the use of lime is the increased make and superior quality of the iron. In the next two examples an improvement in production and grade of metal is also observable, along with an economy of 1·32 cwts. of coke, part of which is probably due to the better yield from the ironstone (Cleveland), as well as to a somewhat superior quality of coke received at the works, when calcined limestone was being used. In none of these instances, judging by the relative quantities of burnt and raw limestone employed, has one-half of its carbonic acid been expelled.

The apparent want of reconciliation between theory and practice in the consumption of fuel, when using the flux raw or calcined, is, in my judgment, in a great measure independent of the imperfect expulsion of carbonic acid from the latter; and further, I am of opinion that a complete separation of this element would fail to effect, in a larger furnace, any appreciable good in respect to the coke required for the process.

Omitting the somewhat questionable economy of fuel exhibited by the figures given above, it is not surprising that a furnace 48 feet high, and containing 6000 cubic feet, should, with a make of 200 to 210 tons per week, be capable of doing some additional duty when relieved of that portion of its work represented by calcining the limestone. In like manner, where a furnace 80 feet high, and containing 15,000 cubic feet, only runs 350 tons a week, and is, therefore, compared with the former, far above its work, any such relief as that in question may be regarded as unnecessary.

The objects of this communication are to show that this supposition is substantially correct, and to endeavor to reconcile the apparent difference between theory and practice just referred to.

For the purpose in question, two of the Clarence furnaces, Nos. 9 and 10, having a hight of 80 feet and a capacity of 20,500 cubic feet, were chosen. They were blown in about twelve months ago, and were working under precisely the same conditions. No. 9 was supplied with raw, and the other with calcined limestone, and after a few weeks this order was reversed—No. 10 was put on raw and No. 9 on calcined.

The consumption of limestone per ton of iron was almost exactly 11 cwts., which, allowing five per cent. of foreign matter, would represent 5·85 cwts. of pure lime, or 6·16 cwts., including impurity, had all the carbonic acid been expelled. By the time, however, that the calcined flux was reduced to 8 cwts., the appearance of the cinder indicated a similarity of composition. This was equivalent, if correct, to an admission that the lime still retained about one-half of its carbonic acid, the truth of which was proved by an analysis of the cinder itself.

Composition of cinder, using:	Raw Limestone.	Calcined Limestone.
Silica	30·84	30·64
Alumina	25·71	25·45
Lime	30·85	31·17
Magnesia	6·92	7·22
Protoxide of Iron	·23	·06
Protoxide of Manganese	·26	·28
Potash	·28	·30
Soda	1·02	1·20
Phosphoric Acid	·34	·44
Sulphide of Calcium	4·09	4·52
	100·54	101·28

Parenthetically it may be observed that no change was effected in removing silicon or sulphur by the substitution of calcined or raw limestone, a sample of No. 3 iron from each giving the following results:

	Using Raw Limestone.	Using Calcined.
Silicon, per cent	1·91	1·91
Sulphur "	·038	·033

With regard to the main object of the experiment, viz., the consumption of fuel, there was literally not the slightest advantage in the use of the flux from which half of its carbonic acid had been expelled. In each case, the burden of mine (Cleveland), on a given weight of coke, remained unaltered, without any improvement in quality manifesting itself, nor was there any tendency to an increased rate of driving. The make was in each case 61 to 62½ tons per 24 hours, the quality averaged about 3·75, and the coke a trifle under 22 cwts. per ton of iron.

Applying the same mode of computation employed at the commencement of this paper, the separation and decomposition of half the carbonic in 11 cwts. of limestone, is equal to about 5550 units per ton of iron, the necessity for which was avoided by the previous calcination of the flux. To this must be added 1950 units, as the heat which will be evolved by the lime re-uniting with carbonic acid in the furnace, which, for the present, we will assume to happen. We have thus 7500 units of heat at our disposal, which at the usual condition of oxidation of the gases in an 80 feet furnace using limestone and driven with air at 485°C (905°F), represents about 1·79, say 1¾ cwts. of coke.

I propose to endeavor to explain the cause of the disappearance of these 7500 units, and the consequent non-effect of their representative 1¾ cwts. of fuel.

In round numbers, calcined Cleveland stone, in an atmosphere of carbonic oxide, may be considered as commencing to lose its oxygen gas, or in other words, to suffer reduction when it is heated to a temperature of 200° to 210° C., say 400° F.

Metallic iron and carbonic acid, with some precipitated carbon, are the products of this action; but if the temperature is raised from 400° to about 800° F, then the carbonic acid, formed by the reduction of the ore, commences to re-oxidize the metallic iron formed at the lower temperature, and this proneness to oxidation by carbonic acid increases rapidly as the temperature is raised. Thus, if a mixture of carbonic oxide and carbonic acid in equal volumes is passed over calcined Cleveland ore at a bright red heat, the latter cannot be deprived of more than one-third of its oxygen; and in like manner, if spongy metallic iron be similarly treated, it absorbs from the carbonic acid as much oxygen as remains combined with the metal contained in the ore, *i. e.*, two-thirds of that required to constitute peroxide of iron.

From the physical laws involved in the facts as just enumerated may be inferred:

1st. That there is a point in which carbonic acid will render complete reduction of an oxide of iron by carbonic oxide impossible.

2d. That this point varies with the temperature, *i. e.*, the reducing power of carbonic oxide is lessened by the oxidizing power of carbonic acid rising as the temperature increases.

Now, my inquiries on this very important question connected with the action of the blast furnace have led me to infer that the gases from an 80 feet furnace of say 15,000 cubic feet, and running 350 tons per week, are saturated with oxygen, as far as they can be, when one-third of the carbon they contain is converted into carbonic acid. The temperature of the gases, when cold ironstone is used, will average under the supposed conditions about 300° C. (572° F).

By the use of the flux, calcined as it was in the experiment we are considering, 7500 units of heat per 20 of iron are practically added to the contents of the furnace, and the presence of this heat at once manifested itself by a rise in the temperature of escaping gases which corresponds to something like 1500 of the 7500 units placed at our disposal.

I would here observe that carbon as well as iron, either metallic or in its lower stages of oxidation is capable of decomposing carbonic acid, and that its power in this respect is also intensified as the temperature is increased.

If, therefore, where by change in the composition of the materials, an increase of temperature in the reducing zone follows as a necessary consequence, a larger proportion of the carbon as carbonic oxide in the gases may arise from one or two causes—either the oxidizing influence of the carbonic acid may be augmented by the change of temperature, and so require the pressure of a larger quantity of carbonic oxide to effect reduction, or the higher temperature may enable the carbon to split up more readily the carbonic acid. Whichever of these two causes is the correct one, the result would be the same, viz., an unburning, as it were, of carbonic acid, which means a large absorption of heat and consequent waste of fuel.

In the case we are considering, this waste of fuel has, of course, been met by the additional heat generated, or not required, as explained by the use of calcined limestone, the loss on the one side being balanced by the gain on the other.

As a matter of fact, this diminution of carbon existing as carbonic acid in the gases is precisely what I found took place in the furnace when calcined limestone in the experimints already described was employed. The analysis of the gases will require repeating, inasmuch as their ascertained composition accounted for rather more loss than the heat which had been added in the manner described.

There is, however, no reason for delaying the communication of these later trials to the Institute. They extended over a period of six weeks at the two furnaces, and the unmistakable conclusion arrived at was. that the expense of calcining the limestone was unaccompanied by any advantage whatever in the operation.

I may add that the presence of caustic lime is supposed, by virtue of the power it possesses of absorbing carbonic acid, to produce the same effect as if this acid were introduced in the form of carbonate of lime. Now, lime in some form or other, exists in calcined Cleveland ironstone to the extent of from 7 to 8 per cent., and magnesia of from 4 to 5. I was, therefore, anxious to ascertain whether these earths were able, in any high degree, to absorb carbonic acid in the cooler portions of the furnace, and in consequence, to carry it down where, by its reaction on carbon, a loss of coke would ensue I would remark that lime and magnesia possibly exist in the native Cleveland ironstone, chiefly combined with silica or alumina, or both; certain it is that the carbonic acid in the raw stone is only about sufficient to form a carbonate with the protoxide of iron present.

Whatever may be the form in which lime exists in the ironstone in its natural state, when calcined, a mere trace—under 0·2 per cent.—was washed out of the calcined ore by chloride of ammonium, and of this a portion was probably soda or potash. The ironstone (calcined), the size of mustard seed, was exposed for 25 hours, at ordinary temperatures, to carbonic acid. The original ore contained ·85 per cent. of this acid, and at the termination of the experiment it contained 1·22 per cent. A second sample was similarly treated, in a tube immersed in a bath of melted zinc, having a temperature of probably 800° to 900° F. The carbonic acid it contained at the end of 2½ hours was ·77 per cent., after which no change of weight took place.

These experiments prove that the presence of lime and magnesia, as they are found in calcined Cleveland ironstone, are inert, so far as any absorption of carbonic acid is concerned.

Physically it would be possible, by a previous fusion of the ironstone with the flux, to render the lime of the latter incapable of absorbing carbonic acid to any extent, which acid would be expelled by such preliminary treatment. There are, however, practical objections to such a course of procedure. Firstly, in a properly constructed blast furnace, say 80 feet high, with a capacity of 15,000 to 20,000 cubic feet, we have seen the total expenditure of coke, entailed by the presence of the carbonic acid of the limestone, is only 1¾ cwts. There is, therefore, no margin to meet any expense which would accompany the operation referred to. Beside this, the altered mechanical condition of the ironstone makes it much less susceptible to the reducing influences of the gases of the blast furnace.

I obtained the following results from specimens of Cleveland ironstone calcined to various degrees of hardness but broken from the same lump. They were exposed simultaneously in the same piece of apparatus during eight hours to a current of carbonic oxide, at a temperature of nearly 800° F.*

Specimens of ironstone.	Loss of original oxygen per cent.	Deposited carbon per 100 of iron.
Burnt to brick red	56·1	5·6
Burnt to brown, not fused	65·2	21·5
Burnt to dark purple, very slightly fused	52·6	8·8
Partially fused	30·4	1·5
Fused	23·9	·51

Mill cinder which, in mechanical structure, would closely resemble ironstone fused with limestone, only lost 1·35 per cent. of its oxygen during 3½ hours' exposure to a red heat. It contained no deposited carbon.

A specimen of properly calcined Cleveland ironstone, and a specimen of mill cinder were placed together during 48 hours in the escaping gases of a 48 feet furnace. The former lost 52·3 per cent. of its oxygen and contained 2·42 of deposited carbon per 100 of iron; the latter only lost about 16 per cent. of its oxygen and had ·25 of deposited carbon per 100 of iron.

These trials prove conclusively that it is best to use ironstone burnt so as to admit ready access to the reducing gases, and that if this be not attended to, the mine will arrive at a point in the furnace where the carbonic acid resulting from deoxidation will be split up or unburnt by contact with highly heated carbon, in the same way as happens when this acid is supplied by the limestone.

* "Chemical Phenomena of Iron Smelting."

* "Chemical Phenomena of Iron Smelting," p 331.

Hanging Rock Furnaces.

Mr. Charles Campbell has prepared a list of the furnaces in the Hanging Rock iron region, both in and out of blast, with the date of erection, owner or owners, builders, names, daily capacity, character of blast, &c., from which we glean the following items:

The first furnace built in Ohio was either "Brush Creek Furnace," built in Adams county in 1810-11, by Ellison, James and Colonel Paull, or the "Yellow Creek Furnace," of Trumbull county, erected about the same time by Mackay, Montgomery & Glendenin.

The oldest one in the Hanging Rock region proper is Argilite and Forge, in Greenup county, Ky., built in 1822 by Richard Deering and Trimble Bro. It was 25 feet high, 6 feet bosh, cold blast, and made the magnificent yield of one ton daily.

Pactolus, in the same county, was built in 1824, by Messrs. McMurty & Ward.

Steam Furnace, same locality, followed in 1825, and was built by Shreeves Bros. It also made one ton daily.

Bellefonte Furnace, same county, was also built in 1825 by Messrs. A. Paul, Geo. Progue and others. It is now operated by Messrs. Means, Russell & Means, 33 feet high, 10½ feet bosh, and with a capacity of 14 tons daily.

Union, in this county, was the first on this side of the river. It was built in 1826 by Messrs. James Rodgers & Co., but we have not further information as to capacity, &c.

Then comes the Sciota Furnace, in Sciota county, built in 1828 by Wm. Satters and others, now a hot blast furnace of 12 tons capacity, operated by L. C. Robinson & Co., of Portsmouth.

Next was Pine Grove Furnace, erected in 1829 by Robert Hamilton & A. Ellison, now operated by Means, Kyle & Co., of Hanging Rock, and making 16 tons daily.

Bloom was built in 1832 by John Benner and others; Ætna in 1832, by James Rodgers and others; Junior in 1832, by Young Bros. and others; Buckhorn in 1833, by James & Findley; Centre, in 1842, by Wm. Carpenter and others; Howred, in 1830, by John Campbell & D. T. Woodrow; Hecla, in 1833, by R. B. Hamilton & McCoy; Lagrange, long since abandoned, in 1836, by Hurd, Gould & Co.; Mount Vernon, in 1833, by R. Hamilton, John Campbell & W. Ellison; Olive, in 1846, by John Campbell & John Peter; Oak Ridge, in 1846, by Prof. W. W. Mather & Gen. O. M. Mitchell; Ohio, in 1845, by David Sinton & T. W. Means; Vesuvius, in 1833, by Hurd, Gould and others; Washington, in 1853, by John Campbell, John Peters and others.

There are 86 furnaces in the list, of which two are projected, three have not yet gone into blast and twenty-two are abandoned. Three are classed as cold blast and four as either hot or cold blast. Nineteen are for bituminous coal, the balance for charcoal. The two new stacks of the Ætna Iron Works are credited with a capacity of 60 tons daily; the Norton and Belfont stacks with 45 each; the Ashland, and Iron and Steel Company, each with 40; and no other is down for a greater yield than 20 tons daily.

Farm Railways.—A wealthy English land owner has recently applied the principle of the narrow gauge railway to the purpose of agriculture, and found that the saving of time and labor, the economy in horse flesh and the comparatively narrow strip of land needed for the road bed, have amply compensated him for the first outlay. The gauge is only two feet eight inches, the boiler barrel two feet eight inches in diameter, and the total weight of the engine, when empty, six tons. A speed of twenty-five miles an hour has been attained, but the full power is practically never used. We have not yet learned the expense; it cannot, however, be great, and it is evident that if such machinery can be employed to advantage in England, where the land is not unfrequently hilly, and the wages invariably low, it must be admirably adapted to our level prarie lands, where labor is often almost unobtainable at rates which will justify employment. A French speculator has already organized a joint stock farming company in Kansas, another is in process of formation in Illinois, and the object of both is to cultivate an immense extent of land at the smallest possible cost. The introduction of the locomotive to the farm generally is merely a question of time. When land begins to be held by large corporations of joint stock companies motion by steam must be substituted for traction by horses. The inventor who first adapts the steam engine to the general demands of agriculture will reap an immense harvest of gain and confer a great benefit upon the country. The engines recently manufactured in England for the East Indies are far from perfect. The American dummy is capable of vast improvement. The hour is approaching, and all that is wanting is the genius of the practical mechanic as specially applied to the farm as heretofore it has been to the factory and the mill.

Mr. T. Terrel, of Cardiff, Wales, has invented an improved process of making tin plates, which consists in covering the iron plates immediately after they have been properly pickled with a thin deposit of any metal which will flux with tin by the electrotyping process, to prevent the immediate formation of oxide on the plates and the peculiarity of the process consists in the combination of the electrotyping with the ordinary dipping process. The plates are then plunged into molten tin, and drawn out through rollers, and thus formed into tin-plates, ready for packing, without further process. To prevent the oxidation of the molten tin he places in the pan containing it a quantity of palm oil only sufficient to produce a film on the surface of the tin.

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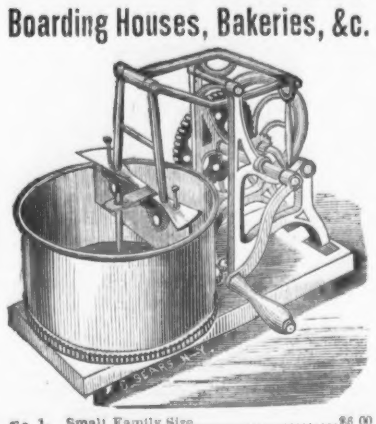

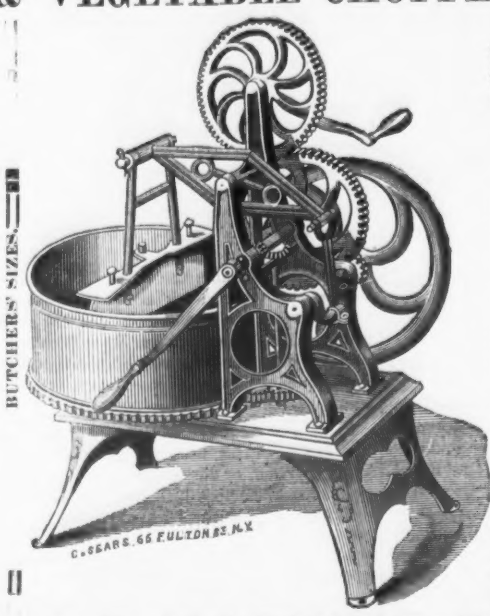

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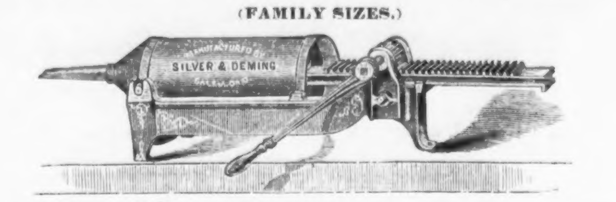

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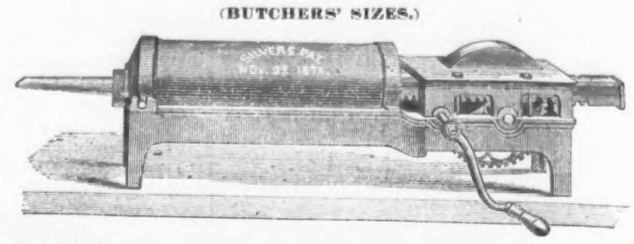

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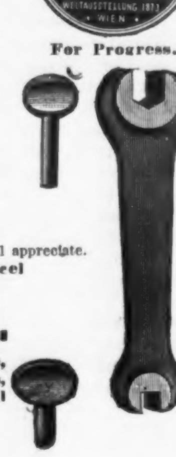

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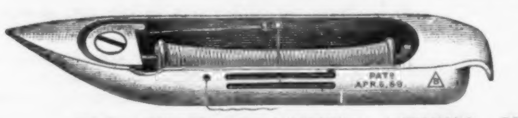

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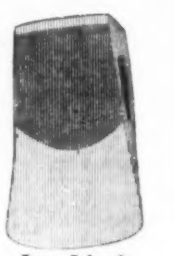

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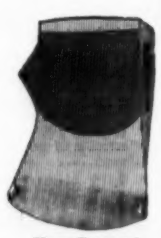

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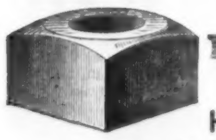

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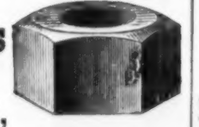

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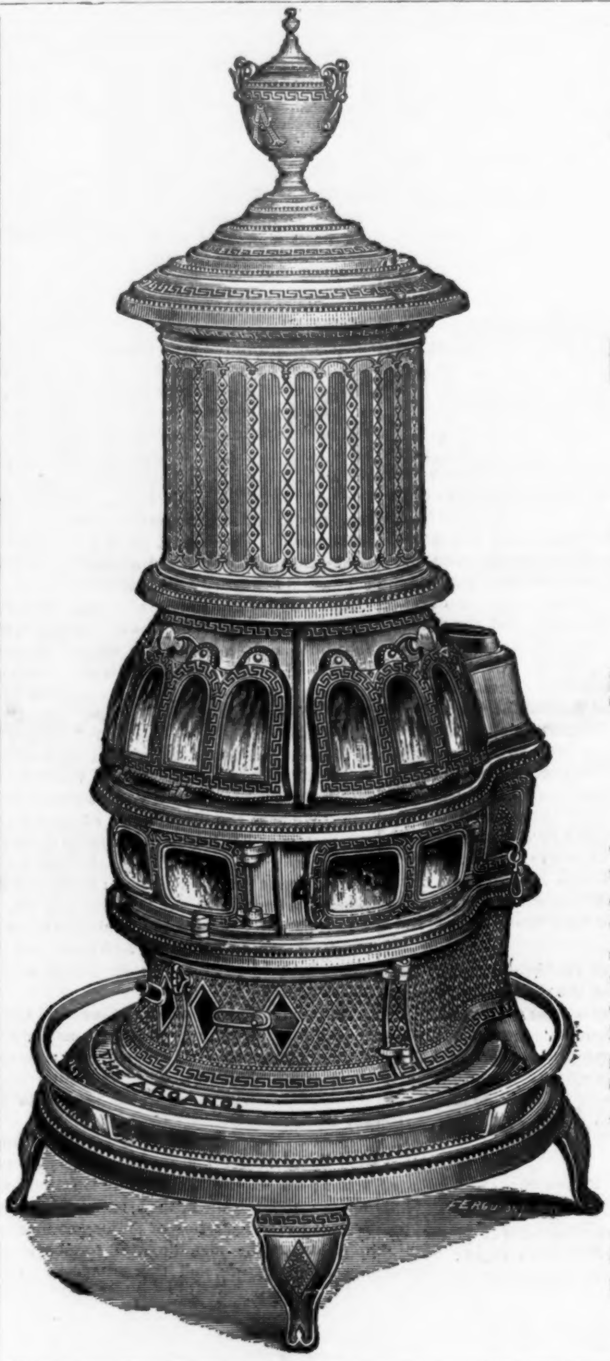

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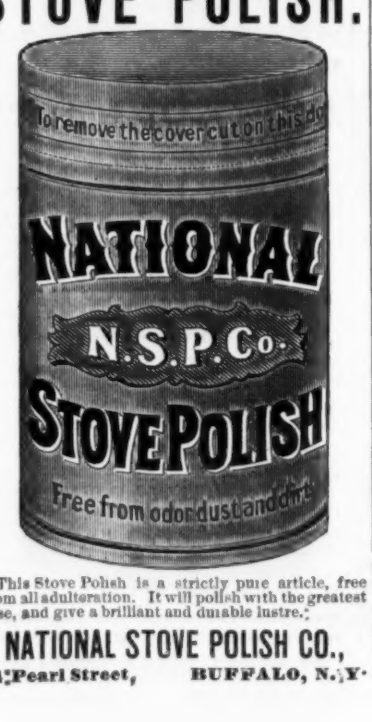

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Thomas's Improvements in Mills for Rolling Flat Bars.

There has lately come into very general use at Pittsburgh and other iron making centers of the West, an improvement in mills for rolling flat metal bars, which has been attended with very economical and satisfactory results in its practical workings. The improvement has for its main object the lessening the numbers and changes of the rolls required for rolling flat bars of varying sizes, and consists in turning each of the rolls in a set either of two or three high with flat grooves of varying depths, and in such manner that the collars between the flat grooves of one roll run in the flat grooves of the contiguous roll, and divide them into two grooves of equal or unequal width, thus doubling the number of working grooves or channels in a set of rolls, and dispensing with the usual collar holes in the top roll of a pair or middle roll of a set of three. The rolls are also made adjustable endways by means of screws applied to the bearings of same, so that the grooves may be varied in width to any extent within the extremes of any pair or set by simply turning the rolls endways in opposite directions, so that the left hand divisions of the grooves become wider, and the right hand narrower, or *vice versa*, thus rendering one pair or set of rolls adaptable for rolling a much greater variety of sizes of flat bars than heretofore. The roll necks, wabblers, and coupling boxes are made longer than usual in the bearing, to allow for this longitudinal adjustment, and the coupling boxes may be kept up to their bearings by means of coiled springs fitting into holes in ends of same instead of by the usual stretchers. The rolls are thus rendered much less liable to breakage than in the usual method of turning rolls, and the collars may be dressed up, as they were, like the other part of the grooves, without rendering them useless from an excess in the width of the bars rolled by such rolls, as the adjustable character of rolls made upon this principle prevents any difficulty from this source.

Another, and in some respects, equally important feature of the improvement, consists in the use of certain new devices in connection with the housing screws of rolls for rolling wide bars or plates of iron, or other metal sheets, so that the rolls can be rapidly and accurately adjusted to run perfectly parallel to each other, or so that the draught may be varied for the purpose of rolling molds for sketch plates, or straightening plates or bars, which tend to leave the rolls crooked. These devices are termed respectively the "fine" adjuster and "coarse" adjuster, and are both used in connection with the ordinary method of actuating the housing screws.

The "fine" adjuster consists of an adjustable coupling to the hand wheel spindle, which is for the purpose divided into two lengths at some convenient point about the middle of its length. The end of one part of the spindle is made to pivot into the end of the other part, or the contiguous ends of the two parts of the spindle are mounted upon bearings in same line of centers, but in such manner as to be capable of working independently, and to have free ends for the attachments of the coupling now to be described. Upon the inner end of one part of the spindle is keyed a worm wheel of any convenient size, and upon the corresponding end of the other part is keyed a face plate or disc, on which are mounted parallel with its face and with each other, but on opposite sides, two shore cross spindles running in bearings projecting from said face plate so far as to throw the short spindles opposite to the middle of the width of the worm wheel. One of the short spindles carries a worm or screw which gears with the worm wheel, and the other runs free of the worm wheel; but the two spindles are geared together by means of a pair of small spur wheels, and each spindle is supplied at opposite ends with a hand wheel or cross to turn it. When the housing screws are worked together by the hand wheel or main spindle, this coupling acts as a fast coupling or clutch, but for the adjustment of the rolls one upon the other preliminary to parallel rolling, or for the variation of the inclination of rolls, slightly to suit the exigencies of rolling plates or sheets colder on one side than the other, or for similar purposes, a "fine" or intermediate adjustment of the housing screws may be rapidly given by the roller or the "catcher" by simply giving a turn or two to one or other of the hand wheels or crosses on the short spindles gearing with the worm wheel of the coupling, thus setting either housing screw forward of the other as much as may be necessary.

The "coarse" adjuster is simply a clutch gearing at the back of one of the mitre or bevel wheels on the horizontal hand wheel spindle. The clutch is a face clutch sliding on a fast feather, and is divided into a number of radial teeth gearing into notches in the back of the mitre or bevel wheel, which runs loose on its shaft when unclutched. By these means the roller is quickly and easily enabled to turn one housing screw by itself, and thus give the top roll the necessary inclination for rolling plates thicker on one side than the other, or for molding sketch plates. Of course, either the "fine" adjuster or the "coarse" adjuster may be used apart from the other, or they may be both used in combination in the same setting apparatus, or the "coarse" adjuster may be used to the roughing rolls, and the "fine" adjuster to the finishing rolls of a plate or sheet mill, as may be required or preferred.

In the operation of this mill, the bloom or pile goes through the top pass first, and, if necessary, the top roll may be made to be raised by balance weights, levers and connecting bars as usual. In this case the screws could be set down for the bottom passes. The bars rolled do not require the usual turn upside down. The last end leaving the rolls is the first end in the next pass. Bars may be finished in any groove, and the thickness regulated by working the rolls nearer or farther apart to the extent of half the depth of the collar. The rolls may be of any usual size, and proportioned to the proposed sizes of the bars to be rolled. The width of the bars may be varied to any dimension between the extremes for which any set of rolls are arranged, by simple resetting their position in relation to each other longitudinally. Mills on this principle are arranged for either two or three rolls high. In 2-high trains the bars may be returned under the rolls, the last end first, which being turned up for the next pass would reverse and prevent the fin as in 3-high rolls. To roll small flats, say from half inch to one and a half inch, the rolls only require to be moved one-quarter inch each way. By these means great saving is effected in the cost of rolls required for rolling any given number of sizes of flat bars of iron or other metal, the wear of the rolls is more easily repaired, and the danger from breakage of the rolls is much less than with the ordinary methods of constructing the rolls.

Utility and Beauty in Hardware.

The following extract from an English work entitled "Principles of Design," will be found to contain suggestions of value to hardware manufacturers in this country:

In hardware we find two classes of work in the market which appear to have little in common, the one class being characterized by a preponderance of excellence, and the other by the dominance of what is coarse and inartistic. The first class of work is that which is produced by what are termed ecclesiastical metal workers; the second consists of what is generally known as Birmingham ware.

It is an error to suppose that these so-called ecclesiastical—or mediæval, as they are sometimes called—metal workers produce only ecclesiastical and mediæval work. On the contrary, some of these men—and they are now many in number—devote themselves almost exclusively to domestic work, and most of them fabricate articles in all styles of art. If I wanted an artistic set of fire irons, I should go to one of the ecclesiastical warehouses, for there I have seen many sets that my reason commends and my judgment approves; but I never saw a set produced for the general market that I liked; and the most artistic fenders, grates and gas fittings, in almost any style, are to be got at these shops. I do not mean to convey the impression that all things made at these ecclesiastical warehouses are good, and that all things of Birmingham (or Sheffield) manufacture are bad, for I have seen indifferent works in these mediæval shops, and I have seen excellent things from Birmingham—especially I might mention as good certain gaseliers produced by two of the smaller Birmingham houses—but, as a rule, the works found in the mediæval warehouses are good, and, as a rule, the works in hardware produced by Birmingham and Sheffield are bad, in point of art.

It will appear a mere repetition if I must insist that the materials of which works of hardware are formed be used in the easiest manner in which they can be worked, and that every article be so formed as perfectly to answer the end of its formation. Yet I must do so. Let us look for a common set of fire irons, and we shall find that nine pokers out of ten have a handle terminating in a pointed knob. Now, as the object of this knob is that of enabling us to exercise force wherewith to break large pieces of coal, the folly of terminating this knob with a point is obvious.

A poker is, essentially, an object of utility; it should therefore be useful. It is ridiculous to talk of a poker as an ornament; yet we find it fashionable now to have a bright poker as an ornament, which is obtrusively displayed to the visitor, and a little black poker, which is carefully concealed from view, reserved for use. I cannot imagine what people will do for show and fashion, but to the thinking mind such littleness as that which induces women to keep a poker as an ornament must be distressing; and until persons who desire to be regarded as educated learn to discriminate between an ornament and an article of utility, little progress in art can be made. If a poker is simply a thing to be looked at then it may be as inconvenient as you please, for it has no purpose to fulfill by its creation it cannot be unfitted to its purpose. The same remarks will apply to shovel and tongs. If they are intended as works of utility, then their forms must be carefully considered; but if they are to be mere ornaments I have nothing to say respecting them.

Utility and beauty are not inseparable; but if an article of any kind is intended to answer any particular end, it should be fitted to answer the end proposed by its formation; but after it is created as a work of utility, care must be exercised in order that it be also a work of beauty. With due consideration, almost every work may be rendered both useful and beautiful, and it must ever be the aim of the intelligent ornamentist to render them so.

The Pittsburgh Exhibition.—The work of preparation for the Pittsburgh Industrial Exhibition has made such rapid progress that the building is ready before the time specified in the contract. Applications for space are coming in freely, and the number of entries promises to be very large. Two lines of shafting have been run through Power Hall, and will furnish motive power sufficient for all purposes. Extra boilers have been put in to furnish steam for boilers, pumps, etc., that may be on exhibition. The Union Bridge Company design throwing a bridge from the Allegheny end of the Union bridge to the Exposition building, thus shortening the distance between the two points.

A new vein of coal, four feet four inches in thickness, has been struck at the shaft of the Jefferson Iron Works, Steubenville. The vein was found at a depth of 225 feet below the urface.

The Ferrie Self Coking Stacks at Ironton, Ohio.

An Important Enterprise Successfully Inaugurated.

(*Special Correspondence of The Iron Age*).

IRONTON, OHIO, Sep. 23, 1875.

To the Editor of The Iron Age.—Never has your correspondent been better repaid than in his visit to this highly interesting locality, to examine the operation of the Ferrie Self Coking Stacks and Whitwell Hot Blast Ovens; for not only was the new furnace at the Ætna Iron Works found working splendidly, but a surprise was in store at the new stack of the Iron and Steel Company, which was blown in on the night of the 18th instant. In the present low stage of water in the Ohio River, this is one of the most difficult places of access in our country, and universal surprise is expressed that our great railroads in branching out have entirely ignored one of our richest mineral regions. There are very few places where so much that enters into the production of iron is to be found so convenient. All around Ironton are rich veins of good coal, iron ore, limestone, and extra fire clay in abundance, and yet the nearest railroad outlet is twenty miles distant. The Iron Railroad connects the town with the mining districts, but gives it no outlet. A railroad built from Columbus to Ironton, probably 120 miles long, would pass for a large portion of its length through rich iron and coal deposits, and run convenient to at least forty blast furnaces.

The Ætna Iron Works, which are located just outside the limits of Ironton, undoubtedly stand at the head of American iron producing plants for their magnificent proportions, symmetry of design and completeness of detail. They consist of two stacks, which stand in a large, airy double casting house, on the bank of the Ohio River. These stacks are each 18 feet 6 inches bosh, and 86 feet 6 inches high, the upper portion being divided into four vertical retorts or coking chambers, formed by supporting fire brick walls upon arches sprung from the furnace lining. The walls are provided with horizontal flues, and vertical segmental flues surround the retorts; through these the gases generated in the cupola of the furnace circulate, and, being ignited, calcine the ore and coke the coal which has been charged into the retorts; the stock passing down into the furnace is converted in the usual manner into iron, cinder and gases.

One of these furnaces, the Alice, was blown in on the 13th instant. The second furnace, the Blanche, is well under way, and is ready for its lining. The buildings are all completed for the two furnaces, are of most ample proportions and of ornamental design, without appearing tawdry or extravagant.

When completed, five vertical blowing engines will furnish blast to the furnaces; at present two of them are in operation. They each have blowing tubs seven feet in diameter and four feet stroke. The blast is heated for the furnace by four of the Whitwell hot blast stoves, which were operating very satisfactorily, and producing a blast of 1450 degrees Fahrenheit this morning. This is the third furnace which has so far put these stoves into operation in America. The tunnel head is fitted with Weimer's furnace charger (the largest yet constructed), which maintains a uniform flow of gas to the hot blast ovens, boilers and coking retorts, and insures its complete utilization.

The water supply is obtained from the Ohio River, and elevated into tanks which form the roof of the engine house, from whence the supply for the ten tuyeres in each furnace, the numerous water valves and valve seats of the Whitwell stoves, and the water plates surrounding the crucible and lower bosh walls, is procured. The amount of water required for the plant is quite large, and to obtain clear water a reservoir and filter have been constructed.

A large ornamented iron stack, lined with fire brick, furnishes draft to the boilers and hot blast ovens. This stack is 195 feet high.

Knowing that *The Iron Age* is not given to fulsome praise, but is always anxious to credit honor to whom it is due, I presume it will join me in congratulating Mr. George Willard, the president, and Mr. J. P. Witherow, the designing and constructing engineer, upon the success which has attended the starting of this great innovation upon iron manufacturing, and also in the hope that their most sanguine expectations may be realized by the satisfactory operation of the furnaces. These gentlemen visited Europe and examined the prominent furnaces there, and also made numerous trips to the noted furnaces in our own land, to secure the most improved appliances. It is yet too soon to say what the furnace will do, for it must at first be fed largely with coke and handled carefully, but this morning everything was working splendidly, and your correspondent saw a cast made after an eight hour run, which amounted to fully 25 gross tons; the cast nearly filling 13 beds, averaging little more than two tons each; and the iron (which has since been examined) proved to be good No. 1 of great strength. The operation of the furnace on its tenth day may, therefore, be summarized as follows: Blast, 5 pounds; product, 75 gross tons of foundry iron; burden, 2600 pounds of Hanging Rock and Iron Mountain ores; 700 tons coke and 1200 pounds bituminous coal; temperature of blast, 1450° Fah. From the above your readers may judge whether or not this enterprise, which has stepped out so boldly from the beaten track of iron manufacture, gives promise of success. Columns could be filled with details and dimensions of the work, but it is evident that before long its importance will bring the subject before us, in proper shape, accompanied by cuts, and the object of giving the readers of *The Iron Age* a brief outline of the work and its operation is accomplished.

Mention has been made of the new stack of the Iron and Steel Company, located in Ironton. It is built with the usual columns and mantles supporting the masonry, which is enclosed in a plate iron casing. The stack is sixteen feet bosh, 58 feet high, and is provided with a bell and hopper. The blast is furnished by two vertical engines each, with blowing tubes 60 inches in diameter and four feet stroke; and after being heated in three-pipe hot ovens, is injected into the furnace by seven tuyeres. The furnace is well constructed, and was built with Mr. Witherow as engineer. It was blown in on the night of the 18th instant, and yesterday (its third day) made 45 tons of iron, most of it foundry 1 and 2. The purpose of the company is to run the furnace on gray forge iron for their large rolling mills.

There seems to be no desire to force either of these furnaces, and considering this fact, the operation, as set forth above, must be admitted as worthy of notice, and far in advance of the average. The burden can undoubtedly be considerably increased as soon as the furnaces get into proper working order.

The new stack of the Iron and Steel Company is constructed so as to be altered into the "Ferrie" system, if its success at the Ætna warrants it. If iron cannot be made as cheaply at Ironton as elsewhere in America, your correspondent is greatly deceived. Its only drawback is the want of railroad communication, or, as you in New York express it, "rapid transit." Yours, truly, BIX.

Novelties in Tableware.—The *Crockery and Glass Ware Journal* describes as follows some recently introduced novelties in tableware, which show a decided progress in the application of the principles of art in the silversmiths' trade: The newest tea sets are square Japanese in oxidized gilt, and engraved with gilt and chased flowers, birds and butterflies. In the Elizabethan style, a set of burnished silver has a base of silver and gilt representing Neptune and sea-gods. A satin-finished set is engraved in gilt by hand in the finest details; an exquisite kettle is included in this set, with highly burnished lid and handle. Another style of tea-set in satin finish, with base of gilt and silver, represents the ancient Greeks mounted and in armor, going to battle; a coffee set is combined with this, and a butter dish. A beautiful bridal set of satin-finished silver was bordered with oxidized silver. The bas-reliefs represent a bridal procession; cupids, with garlands of flowers, the bridal pair, an altar with vapor from the burning offerings, birds, and flowers. Another bridal set is in oxidized *repousse* work, wonderfully elaborate. A silver-gilt dessert set is minutely engraved, and has sets of forks and spoons to match. A silver tea-set of six pieces is enamelled with blue forget-me-nots. An elaborate silver christening-set was engraved in gold butterflies, little children, birds and flowers; this is complete to the lamp and porringer. A dinner set of 20 pieces has a magnificent *epergne*, champagne pails lined with silver, with bas-relief of winged gods driving steeds; the punch bowl is lined with burnished gold. A new style of fruit stands is in the shape of an ancient war chariot guided by figures in armor of satin finish silver; heads of fauna from the hubs of the wheels. An *epergne* of silver is surmounted by a figure of Aurora in silver drapery, studded with golden stars, and wreathed with garlands of burnished gold. The side pieces for fruit and flowers are decorated with *repousse* work. The fashionable spoons and forks come in cases of 9 dozens for a set, Raphael pattern, in satin finish silver, with ornamentation of gilt. New styles of pickle dishes and ice cream saucers are in shell-shape silver, with gold volutes. Quaint little silver tubs, lined with gold, are for mustard, pepper and salt. An elegant toddy set of kettle, lamp and standard, sugar bowl and spoons, is in satin finish, silver and gilt, globe shape. Satin finish silver dishes are long slender ovals. Others have bas reliefs representing Ceres and Neptune exchanging the riches of their kingdoms.

Protection in Germany.—A writer in the *Colliery Guardian*, speaking of the efforts of German manufacturers to secure the enactment of a protective tariff says: The exertions made by the protectionist party seems after all not unlikely to be crowned with some success, as far as the postponement of the abolition of the duty on iron is concerned, supported as the agitators are by the retrograde steps which the neighboring countries are taking on the road to protection. There appears at present every reason to believe that the customs treaties at present in force between Zollverein, France, England and Austria may, as their term expires, be replaced by arrangements based upon a return to protectionist ideas. The agitation both here and in Austria makes a strong point of the fact that England is not, and cannot be, an impartial guide in this question, and that from her position the theory of free trade was always identical with her own interests as opposed to those of Continental nations, and that by exceedingly far-sighted commercial policy, and by her introduction of the clause of the "most favored nation" into all her commercial treaties, she, as the greatest and most powerful producer and merchant in Europe, was always in a position, on a reduction of duty being granted by any other nation in the world, to push her wares into the opening thus created. As the opinion is pretty generally expressed by the German protectionists, she has in reality got the better of every European nation, whilst the concessions which she professes to give in return have never been adequate. As an instance, the authors of the present agitation point to the persistent refusal of England to admit German spirits on cheaper terms against the concession now made to her iron producers.

Trade Report.

Office of THE IRON AGE, WEDNESDAY EVENING, Sept. 29, 1875.

During the past week there have been further indications of a revival in general trade, and the opinion is well established that, while the prices of goods will remain low and profits small, the volume of trade done this season will be larger than that of any previous fall season since the panic. In the financial markets there are few events of general interest to glean from the record of the past week. Money, though abundant, commands somewhat higher rates, and borrowers on call have paid 2 @ 2½ per cent. The discount rate on prime mercantile paper remains unchanged. With an increase in the demands for money to be employed in legitimate commercial business, the rates to borrowers on call will become firmer and time loans less easily obtained by favored borrowers at rates below legal interest.

The gold market has been strong, and the premium well maintained. Cash gold is so scarce in this market that 1-64 @ ⅛ of 1 per cent. per day has been freely paid for its use. On Thursday the Treasury Department sold $500,000 for 116·51½ @ 116·63. The following shows the extreme daily range of the premium:

	Highest.	Lowest.
Thursday	116⅜	116⅛
Friday	116½	116⅜
Saturday	116⅝	116⅜
Monday	116⅝	116⅜
Tuesday	117	116¾
Wednesday	117⅛	116⅞

The stock market has been alternately strong and heavy, but under the manipulation of a strong bear clique the prices of stocks has tended downward. The principal dealings have been in Western Union, Erie, Pacific Mail, Northwestern, and Ohio and Mississippi. We give below the quotations of active shares at the close of business to-day.

The market for government bonds has been strong here and in London. Investment shares, and especially desirable railway mortgages, have been firm and in fair request. We give below the closing prices of governments.

The foreign trade movements for the week are shown in the following tables:

IMPORTS.

	1873.	1874.	1875.
Total for week	$10,902,468	$7,503,092	$6,292,249
Prev. reported	297,309,208	295,437,515	250,620,377
Since Jan. 1	$308,211,676	$302,940,607	$256,912,626

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	100	$940
Brass goods	13	1,636
Bismuth	1	491
Bronzes	70	9,701
Chains and anchors	35	2,838
Copper		1,060
Cutlery	87	37,806
Gas fixtures	1	288
Guns	91	12,787
Hardware	1	7,398
Iron, pig, tons	750	16,216
Iron, sheet, tons	278	49,699
Iron, cotton ties	2,458	3,657
Iron, other, tons	92	5,386
Lead, pigs	2,416	14,851
Metal goods	265	22,032
Nails	4	233
Needles	14	3,014
Old metal		1,181
Platina	3	6,568
Plated ware	1	200
Per. caps	6	631
Saddlery	5	818
Steel	1,298	15,190
Tin, boxes	9,500	67,457
Tin, 1549 slabs	162,870	27,674
Wire	78	4,774
Zinc	169,453	10,585

EXPORTS, EXCLUSIVE OF SPECIE.

	1873.	1874.	1875.
For the week	$6,494,941	$5,278,759	$1,100,294
Prev. reported	208,673,287	212,713,745	181,909,202
Since Jan. 1	$215,168,228	$217,992,504	$186,009,496

EXPORTS OF SPECIE.

Total for the week	$216,421
Previously reported	64,592,829
Total since January 1, 1875	$64,809,250
Same time in 1874	4,786,987
Same time in 1873	3,899,854
Same time in 1872	2,961,288

Government bonds at the close were strong at the following quotations:

	Bid.	Asked.
U. S. Currency 6's	124	124¾
U. S. 6s 1881, reg	121¼	121½
U. S. 6s, 1881, cou	123¼	123½
U. S. 5-20 1862, reg	118¼	—
U. S. 5-20 1862, cou	118¼	—
U. S. 5-20 1864, reg	118¼	—
U. S. 5-20 1864, cou	119¼	119¾
U. S. 5-20 1865, reg	119¼	119¾
U. S. 5-20 1865, cou	119¼	119¾
U. S. 5-20 1865, reg. new	119¼	119¾
U. S. 5-20 1865, cou	119¼	119¾
U. S. 5-20 1867, reg	120⅛	120¼
U. S. 5-20 1867, cou	120¾	121
U. S. 5-20 1868, reg	121⅛	121¼
U. S. 5-20 1868, cou	121¼	121½
U. S. 10-40 reg	116⅝	117⅛
U. S. 10-40 cou	117¼	118
U. S. 5s, 1881, reg	118	118¼
U. S. 5s, 1881, cou	118¼	118½

The latest sales and closing quotations were as follows:

	Bid.	Asked.
Atlantic & Pacific Preferred	9½	9¾
American District Telegraph	24	30
Atlantic and Pacific Telegraph	19½	20
Chicago & Northwestern	39¼	39½
" " Pref	53⅞	54⅛
Rock Island	107⅞	108
Chicago, Bur. & Quincy	111½	112
Col., Chic. & Ind. Cent	4	4½
Clev., Col., Cin. & Ind's	50½	51½
Cleveland and Pittsburgh	90¾	91
Chicago & Alton	97	98¼
" " Pref	103½	103¾
Central Pacific	92¾	—
Consolidated Coal	45	50
Canton	42	45
Delaware & Hudson Canal	120	120¼
Adams Express	101	101¼
American Express	57¼	57½
United States Express	43¾	44
Wells, Fargo & Co. Express	78	79
Erie	16⅛	16¼
Harlem	132	132
Hannibal & St. Joseph	19	19¼
Illinois Central	97¾	98
Lake Shore	53⅝	53⅞
Michigan Central	56¾	57
Milwaukee & St. Paul	34⅛	34¼
" " Pref	63⅛	63¼
New York Central	102⅞	103
New Jersey Central	110¾	111¼
New Jersey Southern	3	4
Ohio & Mississippi	16⅛	16¼
Pacific Mail	36⅞	37
Panama	133	137
Pittsburgh & Fort Wayne	98	98¼
Pacific of Missouri	41⅛	42
Quicksilver	15	15½
" Pref	20	22
Tol., Wabash & Western	6¾	7
Union Pacific	69⅞	70
Western Union Telegraph (ex'd)	75⅞	76
Mariposa	10⅛	11¼
" Pref	11½	11¾

GENERAL HARDWARE.

Although there is a fair amount of business being done, the market lacks animation, and we hear complaints of dullness and depression. The tone of the market, so far as prices are concerned, is exceptionally strong. The demand for Foreign Hardware is light.

Nails continue to be quoted at $3·10 @ $3·20, net, for 10d, according to quantity. At these figures a large amount of goods have changed hands during the week.

The price of Japanned Iron Wood Screws has been fixed at American Screw Co.'s list of September 1, 1875, net.

The Russell & Erwin Manufacturing Co. have reduced the price of Waterman's Patent Bake Pans, made by them, as follows:

Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9	Per doz. $8·00
No. 10	" 10·00
No. 11	" 9·00

Discount 50 per cent.

They have also in press a list of seasonable House Furnishing Goods.

Abraham Bussing, of the Ausable Horse Nail Co., 35 Chambers street, has been appointed general agent for the sale of the Toe Calks made by Sweet's Mfg. Co. These Calks are made of a fine quality of steel, and are warranted to weld and to harden. We are informed that they have been largely used by blacksmiths, and have given general satisfaction.

The manufacturers of Cordage have issued the following revised list under date of 28th instant, showing a decline of half a cent per pound from former prices of Manila and Sisal Rope. The regular trade discount remains unchanged:

PRICES OF CORDAGE.

September 28th, 1875.

Manila Cordage, sizes above 12 th'd	14½ cts.
" " 6 th'd and 9 th'd (¼ in. and 5-16 in. diam)	15½ "
Manila Cordage, 12 th'd, (⅜ in. diam)	15 "
" Hay Rope	15 "
" Cordage, bolt rope yarns	16 "
" " " " 6 th'd and 9 th'd	17 "
Manila Whale Lines	16½ "
Tar'd Manila	14 "
Fine Tar'd Manila Lath Yarn	15½ "
Sisal Rope, sizes above 12 th'd	11½ "
" 6 th'd and 9 th'd	12½ "
" 12 th'd and Hay Rope	11½ "
New Zealand Cordage, sizes above 12 th'd	11½ "
" " 6 th'd and 9 th'd (¼ and 5-16 in.)	12½ "
New Zealand Cordage, 12 th'd (⅜ in.) and Hay Rope	12 "
New Zealand Lath Yarn (Tar'd)	11 "

Owing to the fact that the United States government has warned all quarrymen from taking Oil Stone from the government lands in Arkansas, now in dispute, this article has advanced in price. The manufacturers of Arkansas and Washita Oil Stones have issued the following price list, under date of 25th instant, which shows an important advance over previous figures:

	Per lb.
Washita, No. 1	$0·30
" No. 2	·25
" Extra	·35
" Axe	·22
" High Round Shoe Shaves	·40
" Slips, Round Edge	·60
" Pen Knife Pieces	·60
Arkansas, No. 1	1·35
" No. 2	·90
" Extra	1·50
" Round Edge Slips	2·50
" Files per doz.	2·25

Van Wagoner & Williams, No. 82 Beekman street, have issued the following reduced price list for their Rod and Coil Door Springs:

THE GEM COIL SPRINGS.

No. 1, per doz., $3·50	dis 10 %
No. 2, per doz., $2·50	dis 10 %
No. 3, per doz., $2·00	dis 10 %
Old style Rod Springs (Torrey Pattern)	2·50 per doz., net
Gray's Improved Rod Springs	2·50 per doz., net

This reduction in price (an average of about 20 per cent.) will not, we are informed, in any way affect the quality of the Springs, which will be made in the future, as heretofore, of the very best materials only. It is claimed for the "Gem" Coil Springs (which are warranted to be made of best cast steel) that the medium sizes are stronger and more durable than the largest Springs made of common iron and Bessemer wire by other manufacturers.

W. R. Ostrander requests us to state that the discount of 50 per cent. from his list of Alarm Whistles quoted last week, was intended to apply only to gross lots.

P. & F. Corbin have issued the following circular regarding Eames' Patent Moulding Machine. In their advertisement on page 19 they illustrate this machine, which is worthy the attention of manufacturers:

NEW BRITAIN, CONN., Sept. 25, 1875.

Owing to the improved facilities for making the Eames Patent Moulding Machine, and having entered into a new arrangement with the patentee, we are enabled to offer said machines, on and after this date, until further notice, at the following reduced rates, viz.:

For single Machine	$110
For five or more Machines at one time, each	$100

A snap flask of ordinary size, and a sprue tube will be furnished with each machine.

CAUTION.

Having been advised that certain parties are offering a machine that infringes the Eames patent, we hereby caution all persons against buying, selling, or using the same, as we shall hold all parties responsible for damages who infringe our patents. We have already commenced legal proceedings against parties who are violating our claims by using the machine referred to. As the Eames machine has proved a success wherever used, and its merits are so well established, we take pleasure in commending it to your favorable consideration.

Very respectfully, P. & F. CORBIN.

G. B. Walbridge & Co. have in press the following circular:

NEW YORK, Sept. 30, 1875.

We have reduced prices on our celebrated "Always Cool" and "Diamond Cool" Stove Lid Lifters, viz.:

Always Cool, Japanned	per gross, $9·00
Diamond Cool, "	" 6·00
With a liberal discount if purchased in full barrels.	
Nickel Plated, either kind	per doz., $3·00
Packed in pasteboard boxes of 1 dozen each.	

The "Always Cool" Lifter has been in the market for so many years that its advantages are well known. To meet the demand for a similar article, at less price, we have introduced the "Diamond Cool" Lifter, and recommend it to the trade. Manufactured only by

G. B. WALBRIDGE & Co.,
99 Chambers street, New York.

W. S. Hammond, Lewisberry, Pa., offers his Window Sash Springs at the following list, which is subject to discount 25 per cent. These goods are kept in stock by nearly all of the jobbing Hardware houses in Philadelphia:

Price List of Hammond's Window Sash Springs.

	Per gross.
No. 1, Upper and Lower, for 6 lights 8x10 to 10x12, or a size of sash equal to the above if 2 or 4 lights are used	$13·00
No. 2, Upper and Lower, for 6 lights 10x14 to 10x15, or a size of sash equal to the above if 2 or 4 lights are used	14·00
No. 3, Upper and Lower, for 6 lights 12x15 to 12x18, or a size of sash equal to the above if 2 or 4 lights are used	16·00

We invite the attention of the trade to the advertisement of Boyd & Chase, manufacturers of Arkansas and Washita Oil Stones, &c. Their address is Nos. 388 to 406 East 107th street, and they claim to be the largest manufacturers in the world of this class of goods.

The Rhode Island Horse Shoe Co., of Providence, R. I., have issued a circular, under date of 30th instant, from which we extract the following:

In addition to our well known Perkins and Rhode Island patterns, we call particular attention to our new City Pattern, and more particularly to our Perkins Snow Shoe.

The City Pattern is of the same form and size as the regular Rhode Island, but made heavier and with thicker heels. The Perkins Snow Shoe is a light concave Shoe, and the changes and improvements made this season make the Shoe still more desirable than ever before, being more perfect in form, much more quickly fitted, and more easily driven than any Shoe ever before offered to the shoers. From the form of the concave, the liability to ball up in the snow, to be drawn off in the mud, or to pick up stones, is reduced to the smallest possibility. For light shoeing, for driving horses and those doing light work, they have, during the last six years, steadily gained favor, and are now used largely in some of the largest shops, and upon some of the best horses and fastest trotters in the country. For a winter or Snow Shoe they are unequaled, the concave being made at the best possible angle to prevent the snow from adhering, and the shoe of the right width to prevent the snow or mud from working in and packing between the sole of the foot and shoe. From their peculiar shape they are lighter than any other brand of Shoe, but have as much wearing surface.

The greater number of Shoes in a keg of 100 lbs. brings the price per set down to about the same figure as the ordinary flat Shoe. The complete process of hammering that our Shoes receive gives them a hardness equal to any hand work, and this, with the special attention given to the creasing—whereby we form a rounding edge on the outside of the Shoe (a peculiarity our own, and not done by any other maker), which prevents the cutting of the leg of the horse by interfering—to the punching of the nail holes, and to the uniformity of shape, enables us to offer a Shoe equal to any made by hand, and superior to any machine-made Shoe in the market.

We have appointed Horace Durrie & Co., 97 Chambers and 81 Reade streets, New York, our only agents for the sale of our Horse and Mule Shoes, and they are authorized to sell, at all times, at our lowest factory prices.

RHODE ISLAND HORSE SHOE CO.
F. W. CARPENTER, President.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, Sept. 29, 1875.

Scotch Pig.—A good deal of speculation has been indulged in on the Glasgow market during the week, and prices are in consequence considerably advanced. The following are makers' quotations:

Coltness No. 1	83/6
Gartsherrie No. 1	76/6
Glengarnock No. 1	71/
Eglinton No. 1	68/

Manufactured Iron.—The market is dull, and there is very little doing; prices, however, are a little firmer.

Rails.—There is a little improvement to note in the demand, but it has had no effect on prices, which are nominally £6. 5/ @ £6. 15/ for Welsh Rails.

IRON.

American Pig.—The market continues in the condition last reported. The principal furnaces are holding their Iron firm at our quotations, but we hear on all sides of lower offers from others. Transactions at lower prices are, however, kept so secret that we cannot give particulars. We note the sale of 100 tons Hudson No. 1 Foundry at $25, and 1200 tons Crane and 400 tons Thomas at full prices. We quote as last week: No. 1 Foundry, $25; No. 2 Foundry, $23; Gray Forge, $20 @ $22. During the week the failure of Glass, Neely & Co., Pittsburgh, was announced, and this afternoon the Associated Press dispatches contain the following:

ALBANY, Sept. 21.—The Jagger Iron Co., whose blast works, etc., cost $561,000, is found to be in such a condition as to produce fears that the stockholders have lost nearly the entire amount of their investment. The heaviest creditors are Pennsylvania coal companies, and they are secured by mortgages on the property. An investigation of the affairs of the company is now going on.

Scotch Pig.—In Glasgow a speculative movement has forced up all brands, but principally Coltness and Langloan, to prices far above the legitimate value, but these prices must be paid if the Iron is desired. In consequence of this consignors there have directed all the Coltness and Eglinton here to be peremptorily withdrawn from the market. A little Coltness can, however, still be had at $33·50 @ $34, and some Eglinton at $29 @ $30. The market here, however, continues dull, and does not respond to the state of the Scotch market.

Rails.—The market continues without change, and we continue our quotations of $45 @ $50, at works.

Old Rails.—In the absence of recent transactions we are unable to quote prices.

Scrap.—There are few large lots on the market, and this gives an appearance of scarcity to this article, but there are a great many small holders whose stocks together make a good aggregate. We note sales of 1100 tons Wrought and Cast on private terms; also 100 tons Wrought at $30, bought by a dealer. We quote $30 @ $32·50 for Wrought.

METALS.

Copper.—Business in this metal has been sluggish, and not as it should be at this season of the year; manufacturers say they are not making money, and do not feel disposed to anticipate wants while this is the case. Sales for the week have thus been restricted to between 300,000 and 400,000 pounds Lake Superior at 23½c. @ 23¾c., on the spot, nothing transpiring in futures. While the demand is light, the offerings are equally so. Baltimore is worth 23½c. in a small way. On Saturday the usual official cable dispatch came to hand from London, according to which the market there had been slightly looking up, the quotation being £82 for Chili Bars and £89 for Best Selected. Private cables since received quote Bars £81 @ £81. 10/. Mail accounts have dropped in up to the 18th instant from London. The Board of Trade returns of the United Kingdom show an import of Copper and Ore of 53,365 tons during the first eight months of the year, against 50,518 and 46,339 in 1874 and 1873, while the export of Copper and its manufactures reached 33,521, against 40,295 and 37,649. The excess in imports and diminished export deserve attention. One of the reports received reads as follows: "Bars were tolerably active at the commencement of the week, and a considerable quantity changed hands at the current values; since then, however, the inquiry has gradually fallen off, and quotations have become somewhat easier. Yesterday afternoon the Chili charters for the first half of the present month were advised by telegram as 2500 tons pure, and operators are now waiting to see what effect the news will have upon the market before entering into fresh business. Australian sorts remain unchanged. English is quiet, and some parcels of Tough and Select are obtainable from second hands at lower figures than the smelters are willing to accept." The manufactures of Copper have been well supported here at the following rates: New Copper Sheathing, 30c.; Bolts and Braziers', 31c.; Bronze and Yellow Metal Sheathing, 22c., and Bolts, 28c., net cash.

Tin.—Operators here have at length been stirred up, and some 3000 slabs Straits have been purchased spot, and to arrive, at between 18⅞c. and 19½c., gold, as well as some English and Malacca. As the available supply has now become well concentrated in few hands, while the amount afloat is comparatively moderate, the metal promises to be sustained at about present rates for a month or two to come. The movement, long delayed, has put the screws to the article rather tightly all of a sudden, more so perhaps than would seem judicious. Had the operation been undertaken at an earlier stage, and the market been made to advance by degrees, consumers would have better supported it in accordance with their requirements, whereas now they feel rather diffident. A great deal will now depend on the European market, which to-day (by cable) presents features of hesitation, one telegram quoting £88 for Straits, and another £86, while L. and F. is quoted £91, and Banca £93. Singapore has improved to $23·50 @ $24. We quote, on a steady market, Straits and Malacca, spot, 20c. @ 20¼c., gold, per pound; in large lots, to arrive, 19½c. @ 19¾c.; English Refined, 19⅝c. @ 20c.; ditto Common, 19⅝c.; and Banca, 24c., all gold. The report by mail from London, dated 18th instant, expresses itself to the following effect: "English has advanced about 1/ per cwt., in sympathy with other sorts. In foreign descriptions we note a very brisk trade, accompanied by a rise in value of about 1/ per cwt. since Friday last, the tendency of the market at the close yesterday being still upward. The Tin annually raised in Cornwall in metal is roughly estimated at 11,000 tons." To-day the Dutch sale is coming off, which will comprise 23,000 slabs Banca. *Tin Plates.*—According to recent cable news the closing of works in England is going on uninterrupted. This, and the low price now ruling, places the article in rather a stronger position, and the general impression seems to be that it has touched bottom in our midst. While such are the views of most of the parties dealing in it, trade therein still flags, and the transactions have been restricted to a moderate jobbing demand. We quote, gold per box, large lots, ordinary brands, as follows: Charcoal Bright, $7·37½ @ $7·50; ditto Ternes, $7 @ $7·12½; Coke Tin, $6·37½ @ $6·50; and ditto Ternes, $6·25 @ $6·37½, all gold.

Lead.—The monotonous state of affairs in ordinary Domestic continues unbroken, and about 140 tons thereof have been placed at the low figure of 5·70c., gold. We quote the same, 5·70c. @ 5¾c., gold. Markets at West for the same species of Lead have also shown weakness. Common Foreign remains firm at 7¼c., gold, asked. The European markets present no new features; according to cable reports good soft English Pig still ranged between £23. 5/ and £23. 10/ per ton at London. We have the mail accounts before us up to the 18th instant, when the demand was less brisk. A more ample supply was expected, and unless the various governments resume purchases, the markets there may easily recede a little upon the close of navigation at the more northern ports. Manufactures of Lead are sustained as follows: Bar, 8⅝c.; Pipe, 9¼c., and Sheet 9¼c., less 10 per cent to the trade.

Spelter and Zinc.—The combined producers have determined to leave the present price of Domestic Spelter unaltered for another month. We understand that outside of New York some 200 tons have sold at 7¼c., currency, on time. Nothing has been done in Foreign, either on the spot or to arrive, and we go on quoting the same nominally 7½c. @ 7⅝c., gold. The report by mail from England, dated 18th inst., says: "High prices have again been paid in the week for some considerable quantities, and Zinc has been advanced 2/." Nothing of special interest from the Continent. *Sheet Zinc.*—The market here is quiet and unchanged at 8⅝c. @ 9c., gold, as to size.

Antimony.—Remains moderately active and firm at 13½c. @ 14c., gold, for Foreign, according to quantity. The stock is running low.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending Sept. 28, 1875:

Hardware.

Boker Hermann & Co. Packages, cs., 10; Cutlery, pkgs., 2
Bloom & Brown, Cases, 1
Bloomfield J. C. & Co. Guns, cs., 1
Cohen W. Cases, 1
Carey Samuel, Grindstones, cks., 13
Calhoun, Robbins & Co. Cases, 4
Connolly T. J. Cutlery, cks., 1
Dickinson Henry, Cases, 1
Friedmann & Lauterjung. Mdse. pkgs., 6
Frasse P. A. & Co. Mdse. pkgs., 4
Fuller Bros. Mdse. pkgs., 2; Cases, 2
Field A. & Co. Mdse. pkgs., 11; Packages, 49; Chains, cks., 33
Gillespie J. D. C. Casks, 2
Graeff Chas. Wire, cks., 4
Howard, Sanger & Co. Cutlery, cs., 2
Henderson L. Cases, 2
Harmar W. H. & Co. Casks, 2
Horton John, Cases, 6
King, Briggs & Co. Chains, cks., 3; Guns, cs., 1; Cases, 1
Laughland & Co. Netting, cs., 1; Wire, pkgs., 7
Lau & Garichs, Mdse. pkgs., 1; Arms, cs., 5
Moore's J. P. Sons, Mdse. pkgs., 1
Merchants' Dispatch Co. Guns, cs., 5
Mason John W. & Co. Wire rope, coils, 12; Iron works, cks., 1
Merwin, Hulbert & Co. Guns, cs., 3
Nicholson R. Wire, bdls., 101; Wire, cs., 4
Siegel T. F. Cases, 13
Schuer Bros. Packages, 6
Sussfeld, Lorch & Co. Cases, 2
Shannon, Miller & Crane, Arms, cs., 1
Schuyler, Hartley & Graham, Cases, 2
Schoverling & Daly, Mdse. pkgs., 12
Sellers A. Cutlery, cs., 1
Tomes Francis & Co. Gun caps, cs., 10; Gun, wads, cs., 1
Van Wart & McCoy, Mdse. pkgs., 26
Ward A. Mdse. pkgs., 5
Wiebusch & Hilger Mfg. Co. Mdse. pkgs., 15; Anvils, 200
Chains, cks., 51; Wire, cks., 5
Order. Packages, 6; Cases, 5; Wire, cs., 16; Files, cks., 10; Guns, cs., 8

Iron.

Brand Jas. Pig, tons, 100
Henderson Bros. Pig, tons, 100
Irwin R. & Co. Pig, tons, 300
Laughland & Co. Hay bands, bdls., 915
Marvel Wm. D. Ore, tons, 300
Page E. & Co. Bars, 29
Order. Pig, tons, 100; Rods, bdls., 185

Steel.

Bloom & Brown, Cases, 15; Bundles, 165
Dolge Alfred, Wire, cs., 2
Hazard F. D. Scrap, tons, 22; Scrap, spring, tons, 38
Hogan John, Cases, 18
Nicholson R. Bundles, 69; Cases, 3; Bars, 3
Naylor & Co. Scrap, spring, tons, 41
Owen A. Bundles, 203; Bars, 1
Prosser Thos. & Sons, Packages, 136
Robbins C. & Sons, Bundles, 107
Sanderson Geo. & Co. Bundles, 23; Cases, 10; Casks, 9
Order. Bundles, 738

Metals.

Bruce & Cook, Tin plates, bxs., 1256
Byrne Joseph & Co. Tin plates, bxs., 723
Dickerson, Van Dusen & Co. Tin plates, bxs., 1054
Darrell & Co. Brass and copper, bbls., 1
Meyer Moritz, Lead, bars, 1806
Naylor & Co. Tin plates, bxs., 697; Taggers, bxs., 100
Phelps, Dodge & Co. Tin plates, bxs., 3003; Tin and terne plates, pkgs., 1014
Wheeler E. S. & Co. Tin plates, bxs., 476
Order. Terne plates, bxs., 280; Lead, bullion, bars, 17; Tin plates, bxs., 2140
Without bills of lading. Tin plates, bxs., 759

OLD METALS, PAPER STOCK, &c.

We have no perceptible improvement to report in the condition of this market since our last. There has been a slight call for some articles, but as a whole the market is extremely dull. The Rag and Paper Stock markets continue unchanged from the dullness previously noted. Hemp and Grass Rope are in good demand, and are scarce in the market. Dealers are paying 3 cents a pound for all that is offered for sale. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5¼c.; Tea Lead, 4½c.; Zinc, 4¼c. @ 4½c.; Pewter, No. 1, 18c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5¼c., Wrought Iron, 1c.; Sheet do., ¾c.; Cast, do., ¾c.; Machinery, do., ⅝c.

Rags, &c.—Canvas, Linen, 4⅝c. @ 5¼c.; do. Cotton, No 1, 5⅝c. @ 6¼c.; No. 2, 2¼c.; White, No. 1, 6¼c.; No. 2, 4c.; Colored, do., 2c. @ 2¼c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5¼c.; Gunny Bagging, 1⅝c.; Jute Butts, 1⅝c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1⅜c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4⅛ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 3c.

COAL.

Representatives of the leading coal companies, including the Reading Coal Company, the Delaware and Hudson Canal Company, the Lehigh Valley Company, the Delaware, Lackawanna and Western Coal Company, and the Lehigh and Wilkesbarre Coal Company, held a meeting last Wednesday, Sept. 22d, and agreed to advance the price of the smaller sizes of Coal ten cents per ton. The Delaware, Lackawanna and Western and Delaware and Hudson Canal Companies also agreed to suspend shipments to competing points for the first two weeks in October, thus affording the Reading Railroad, the Lehigh Valley, and other companies in the combination, opportunity to make up the proportion of tonnage to which they are equitably, and by the terms of the combination, entitled, and are now short of by reason of coal suspension at the beginning of the year. The stock of coal is now ahead of the market, and it is doubtful whether the two weeks' suspension by the two companies named will enable the demand to catch up with the supply. We understand good feeling prevails among the several companies to the combination, and that it is altogether probable that the present policy of the trade will be continued—that is, the policy of a monthly increase of the prices of coal and an equitable division of tonnage among the several companies in the trade.

The quantity of Coal sent from the Schuylkill region during the past week was, by rail, 114,766 tons; by canal, 38,752 tons; total, 153,518 tons, against 73,107 tons for the corresponding period of last year. Increase, 80,411 tons. The total so far this year is 2,834,373 tons, against 3,187,153 tons for same period last year; decrease, 352,780 tons.

The quantity sent from all the regions for the week was: Anthracite, 557,453 tons; Bituminous, 93,875 tons; total, 651,328 tons, against 437,162 tons Anthracite, and 77,469 tons Bituminous for the corresponding period last year. Increase of Anthracite, 120,291 tons; increase of Bituminous, 16,406 tons. Total increase, 136,697 tons.

The quantity sent from all the regions so far this year foots up 13,480,475 tons Anthracite, and 2,616,053 tons Bituminous. Total, 16,096,528 tons, against 14,013,731 tons Anthracite, and 2,528,317 tons Bituminous; total, 16,542,048 tons for same period of last year, showing a decrease in Anthracite of 533,256 tons, and an increase in Bituminous of 87,736 tons.

The following are the cargo prices of the different companies' Coal delivered at the various shipping ports near New York during the month of October:

FROM WYOMING REGION.	L.	Str.	Gr.	Egg	Sto.	Cht
Lackawanna D. & H.	$5 05	5 15	5 25	5 65	6 10	4 95
Wilkesbarre	5 05	5 15	5 25	5 65	6 10	4 95
Plymouth Red Ash, net	5 10	5 15	5 25	5 65	6 10	4 95
Pittston, open market	5 05	5 15	5 25	5 65	6 10	4 85
Scranton	5 00	5 10	5 20	5 45	5 90	4 90
FROM LEHIGH REGION.						
Old Company's Summit	5 55	...	5 55	5 65	6 10	5 10
N. Y. Lehigh Coal Ex.	5 55	...	5 55	5 65	6 10	5 10
Honey Brook Lehigh	5 55	...	5 55	5 65	6 10	5 10

Freights from the above shipping ports to New York city are as follows, including the unloading:

Hoboken	40	Rondout	50
Weehawken	40	Elizabethport	40
Port Johnston	40	South Amboy	45

We quote as follows: Anthracite, $4·95 @ $6·10; Cumberland, $6·25 @ $6·75; West Virginia, $6·75 @ $8; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $11·50; American Gas, $6·75 @ $7·25; American Cannel, $12 @ $14; Pennsylvania and Westmoreland, $6·75; Murphy Run, $6·50; Newburgh Orrel, $6·50; Sterling Ohio, $10; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $10 @ $12; Newcastle Gas, $8; Scotch, $7·50 @ $9.

The Coal transported over the Cumberland Branch Railroad during the week ending Sept. 25, 1875, amounted to 6758 tons, as against 5972 tons shipped in the corresponding period of last year, showing an increase of 786 tons. Over the Cumberland and Pennsylvania Railroad, for the same period, the shipments were 46,303 tons, against 46,938 tons shipped in 1874, a decrease of 635 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 1,705,446 tons.

PHILADELPHIA.

PHILADELPHIA, Sept. 28, 1875.

The market has been active, with unusually large transactions at low figures, sales being stimulated by a reduction in prices by the fear of increased production and by the approach of winter. The sales, which have included both Lehigh and Schuylkill irons, have amounted in the aggregate to some 30,000 tons of Pig metal, and have served to clear off the market the most of the low priced Pig offering, since the bulk of these transactions have been made. The report that the Reading Coal and Iron Company has withdrawn its offer to the furnaces, including those which had already accepted, said to be twelve stacks, has strengthened prices and the market is stronger than for some weeks. Manufactured Irons continue dull with some fair sales of Rails. Old material is a trifle duller and Scrap not quite so much sought. We quote:

PIG IRON.—No. 1 Foundry, $25 to $25·50; No. 2, $22 to $23; Gray Forge, $21 to $22.

BARS—2·6c. to 2·7c. per lb.

RAILS—$45 to $50.

OLD RAILS—$27.

SCRAP.—$30 to $32.

Sales include an aggregate of 30,000 tons Foundries and Forge at various prices, but rarely below those quoted. 1200 tons No. 1 at $25·50, and a reported sale of 8000 tons No. 2 on private terms; 4000 tons Rails, 56's, Western delivery, at private terms; 1000 tons Old Rails at $27 here; 1000 tons mixed lots Scrap at $31 to $32, as to selections.

PITTSBURGH.

PITTSBURGH, Sept. 27, 1875.

PIG IRON.—No change to report in the situation, either past, present or prospective. Trade continues very dull—unusually so for this season of the year—and while producers continue hopeful, the outlook is not encouraging. It was expected last month that there would be quite a stir in the raw article this month, but these expectations have not been realized. The mills, in consequence of the very unsatisfactory and unremunerative condition of the market for the products, instead of taking a two or three months' supply, as they would have done had trade in manufactured goods turned out as expected, are buying only as their immediate necessities require. However, notwithstanding the general tone of the market is weaker, some well informed operators are of the opinion, in view of the reduced stock and light production, that prices are much more likely to advance than decline, and the trade generally do not expect Pig Iron to go any lower. The stock, not only here, but in the Shenango and Mahoning valleys, is down lower than it has been for several years, and a large percentage of the furnaces are still out of blast. Gray Forge Iron is quotable at $24, 4 months; No. 1 Foundry, $24 to $28; No. 2, $25 to $26; White and Mottled, $21·50 to $22·50; $28 to $30 for Hot Blast Charcoal, and $35 to $40 for Cold Blast.

MANUFACTURED IRON.—The general position of the market for Manufactured Iron remains substantially as noted in my last report; business continues dull and unsatisfactory. In addition to a light demand, prices are irregular and unremunerative, and as long as over production continues there is not much show for an improvement. The proposition which was submitted at the last meeting of the Association to curtail the production by getting all the mills to stop one week of each month for three or four months is still being agitated. It is claimed by the friends of this movement that if it was faithfully carried out and generally entered into that there would be a very decided improvement in the market, but there are so many different interests to harmonize that it is feared the project cannot be entered into. The new card, or, rather, the re-classification of the old one which was reported by the committee appointed for that purpose and reported to the last meeting, will doubtless be adopted at the next meeting of the Association. Bars are quoted all the way from 2·25c. to 2·40c., 60 days, with two per cent. off for cash.

NAILS.—There is a continued freer demand for Nails, although makers report that orders have commenced to slack off, and it is still complained that current rates afford little or no margin for profit. There is no established card rate, as it was agreed at the last meeting of manufacturers to let each manufacturer for the time being make his own price, but there are few if any sellers under $3, 60 days, 10 cents rebate for 100 keg lots and two per cent. discount for cash, which brings the net price down to about $2·85.

SCRAP IRON.—There has been no improvement in the demand during the past week, and, furthermore, the outlook is not encouraging, and does not indicate that there will be any change for the better for some time to come. Prices nominally unchanged: No. 1 Railroad Wrought Scrap held at $29 to $30, 4 months, delivered free at mills.

WINDOW GLASS.—There is an increasing demand; orders continue to come forward freely. Some of our manufacturers report that they are considerably behind their orders, but there has been, as yet, no improvement in prices, although there is a firmer feeling, and as it has been pretty well demonstrated that hard pan has been reached there is a decidedly firmer feeling, and some makers are indifferent about selling at current rates. Discounts may be quoted at 75 and 5 to 75 and 10 for car load lots.

FAILURE OF GLASS, NEELY & CO.—On Saturday, Messrs. Glass, Neely & Co., proprietors of the Keystone Iron Works, made the announcement that they were obliged to suspend payment. Their liabilities are placed at $310,000 and assets at $350,000, leaving, if this statement is correct, considerable of a surplus. Had they been able to secure prompt payment from their debtors they would not have failed. A voluntary petition in bankruptcy will be filed in a day or two, and the creditors will be obliged to devise a plan for the adjustment of the difficulties. It now looks as if the wish of Messrs. G., N. & Co., in regard to the mode of settlement, would have considerable weight, and it is not improbable that the firm may be able to resume operations again before long.

The Pittsburgh *Commercial* of Sept. 25, says: The market for raw irons the past week has been extremely dull, and sales limited to a few small lots. Prices remain about the same as at date of last report, with a slight tendency to decline. The quantity of standard quality gray forge iron on the market is not large, but lots offered for sale are so pressed that it has the effect to weaken the market. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

200 tons white and mottled	$21·50—4 mos.
100 tons gray forge	24·00—4 mos.
50 tons white and mottled	22·50—4 mos.

ALLEGHENY COKE.

200 tons cold short	$22·50—cash
200 tons cold short	22·50—cash
200 tons cold short	24·00—time

CHARCOAL.

65 tons No. 1, h. r.	$30·50—4 mos.
40 tons No. 2, h. r.	26·00—4 mos.
50 tons No. 1, h. r.	29·00 @ 30·00—4 mos.
25 tons No. 2, h. r.	27·00—4 mos.

ANTHRACITE.

200 tons No. 3 forge	$22·00—4 mos
30 tons No. 2 foundry	24·00—5 mos
30 tons No. 1 foundry	27·50—4 mos

CONNELLSVILLE COKE.

50 tons gray forge	$24·00—4 mos
10 tons No. 2 foundry	24·00—cash

BLOOMS.

30 tons anthracite	$60·00—6 mos

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Sept. 23, report the Iron market as follows: We notice some little improvement in trade the past week, but prices are very low, with no probable improvement for some time to come. We quote as follows:

Mo. Stone Coal, No. 1 F'dry	$27·00 @ 28·00—4 mos.
" " No. 2 F'dry	25·00 @ 26·00—4 mos.
" " No. 1 Mill	23·50 @ 24·00—4 mos.
" Charcoal, No. 1 F'dry	27·00 @ 28·00—4 mos.
" " No. 2 F'dry	26·00 @ 27·00—4 mos.
" " No. 1 Mill	23·50 @ 24·00—4 mos.
Tenn. Charcoal No. 1 F'dry	26·00 @ 27·00—4 mos.
" " No. 2 F'dry	25·00 @ 26·00—4 mos.
" " No. 1 Mill	24·00 @ 25·00—4 mos.
Georgia Coke No. 1 Mill	25·00 @ —4 mos.
" " No. 2 Mill	24·00 @ —4 mos.
H. R. Charcoal No. 1 F'dry	27·00 @ 28·00—4 mos.
H. R. " No. 2 F'dry	26·00 @ 27·00—4 mos.
H. R. " No. 1 Mill	25·00 @ 26·00—4 mos.
Massillon, A No. 1 Iron	33·00 @ 34·00—4 mos.
" B No. 1 Iron	32·00 @ 33·00—4 mos.
" No. 2 Iron	30·00 @ 31·00—4 mos.
Cold Blast Car Wheel, Mo.	32·00 @ 33·00—4 mos.
" " Tenn.	32·00 @ 33·00—4 mos.
" " Ala.	32·00 @ 33·00—4 mos.
" " Hanging Rock	50·00 @ 53·00—4 mos.
No. 1 Wrought Scrap	1c. per lb.
Heavy Cast	9·10c. "
Light Cast	5·10c. "

BOSTON.

SEPT. 25.—*Pig* continues to rule nominally steady at quotations, with very little business doing. The receipts here are nothing, while the stock is still ample for all the prospective requirements of the winter's demand. There has been a little enthusiasm worked up in Wrought Scrap, more from the facts of its relative scarcity than from the positive inquiries from the furnaces. We quote nominally No. 1, $29 @ $30; No. 2, $24 @ $27; and Gray Forge, $21 to $24. *Bar* has had a quiet week again, with prices settled to a range of $58 to $60, and not a few transactions 50c. under our lower quotations. The extreme is rarely obtained, the lower price being that which is the more general. *Steel* continues to sell with a better tone to machinery. We quote: American Tool, 14c. to 15c.; American Machinery, 9c. to 9½c.; do. Cast Tires, 8½c. to 12½c.; Sweet's Excelsior Tire, 7c. to 7½c.; English Tool, 16c. to 18c. *Copper* is having a very small business, chiefly from the small foundries, who are unable to supply all their wants out of old metals. The large manufacturing concerns are running very moderately, and ask very few attentions from ingot. Prices remain steady at 23½c. for spot and futures. For manufacturers we quote: New Sheathing, 30c.; Bolts and Braziers, 31c; Yellow Metal Bolts, 20c. to 29c. *Lead* is still very dull and stocks now quite large, but prices are nominally strong, holders being inspired with confidence in the future. We quote Pig 6c. for Domestic, and 6⅜c. to 6⅝c. for Foreign; Sheet and Pipe Lead, 9½c., currency; Tin Lined Pipe, 16½c.; Bar Lead, 6¾c., less usual trade or 10 per cent. discount. *Antimony* is firm, with 13¼c. to 13½c. as to lots bought. *Spelter* is strong and dull at $7·55, 30 days, and $7·40, prompt cash, all currency. Silesian is having a trival business at $7·30. *Tin* is firmer from the results of advices from abroad, where a new combination is understood to be forming for the control of the Continent and Great Britain. We quote Straits, 18¾c. to 19c.; Banca, 23c.; Refined English, 18¾c. to 19c., gold. Plates are active; we quote Charcoal I. C., $9·50 to $10; Coke, $7·75 to $8; and Terne at $7·50 to $11, gold.—*Com. Bulletin.*

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Sept. 27, write us as follows: PIG IRON.—Without noticeable change the market rules as last reported, quiet and steady, without particular activity in any grade. The stock of mill is smaller, without doubt, than of any other grade, and holders are not inclined to make concessions. Foundry Irons are in ample supply, and during the week have moved slowly; there is, however, increased inquiry at the close.

HOT BLAST CHARCOAL.

Hanging Rock No. 1.. ℔ ton.	$26·00 @ —4 mos.
" " No. 2	24·00 @ —4 mos.
" " Forge	23·00 @ —4 mos.
Southern Brands No. 1	24·00 @ 25·00—4 mos.
" Forge	22·00 @ —4 mos.
Virginia No. 1	25·00 @ 26·00—4 mos.
" No. 2	24·00 @ 25·00—4 mos.
" Forge	22·00 @ 23·00—4 mos.

HOT BLAST STONE COAL AND COKE.

Hanging Rock No. 1... ℔ ton.	$24·00 @ 25·00—4 mos.
" " Forge	22·00 @ —4 mos.
Red Short No. 1	27·00 @ —4 mos.
" Forge	24·00 @ —4 mos.
Am. Scotch, No. 1	25·00 @ 26·00—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ℔ tn.	$40·00 @ 50·00—4 mos.
Missouri " "	35·00 @ 40·00—4 mos.
Southern Br'ds " "	30·00 @ 40·00—4 mos.
Machinery and Forge	30·00 @ 40·00—4 mos.
Blooms	70·00 @ 90·00—4 mos.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Sept. 28: Trade for the season is ruling light, and so far the fall demand has proved disappointing and unsatisfactory. Orders are placed cautiously and for early wants. We quote the market as quiet, with unaltered list.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick / 1 to 4½ wide by 1⅛ to 2 thick	2·6-10 to 2 7-10c. ℔ ℔.
Round and square, ordinary sizes, from ⅜ to 2 inclusive	2 6-10 to 2 7-10c. "
Hoop Iron, 1⅛ wide and upward	4½ to 4¾c. "
Band Iron, from 1⅛ to 4 in. wide	3¼ to 3½c. "
Horse Shoe Iron ⅜ to 1 wide by ⅜ to ⅝ thick	4 to 4¼c. "
Norway Nail Rods	7 to 7½c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15½ to 16c. "
Machinery Steel	11 to 11½c. "
Cast Spring Steel	10 to 10½c. "
Homogeneous Steel Plate	10½c. "
Perkins' Horse Shoes, per keg of 100 lbs.	$5·12½
" Mule Shoes " "	6·12½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per ℔.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per ℔.

R. R. Spikes.......5½ by 9-16 at 3c to 3¼c. per lb.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of Sept. 27: We have no change to note in the Iron market since our last report. We quote:

Baltimore Charcoal	$32·00 @ 35·00
Virginia "	31·00 @ 34·00
Anthracite No. 1	25·00 @ 26·00
" No. 2	23·00 @ 24·00
" No. 3	22·00 @ 23·00
White and Mottled	19·00 @ 21·00

CLEVELAND.

Messrs. C. E. BINGHAM & Co., 25 West Main street, under date of Sept. 27, quote the Iron market as follows, 4 mos. time:

FOUNDRY IRON.

No. 1 Lake Superior Charcoal	$31·00—4 m.
No. 2 " "	30·00—4 m.
No. 1 Anthracite	28·00—4 m.
No. 2 "	26·00—4 m.
No. 1 Bituminous	27·50—4 m.
No. 2 "	26·00—4 m.
No. 1, Cherry Valley Am. Scotch	31·00—4 m.
B—1 " "	28·50—4 m.
No. 2, " "	27·50—4 m.
No. 1 Massillon	30·50—4 m.
B—1	28·00—4 m.
No. 2	25·50—4 m.

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	$30·00—4 m.
No. 4 " "	32·00—4 m.
Nos. 5 & 6 " "	32·50—4 m.

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	$30·50—4 m.

FORGE IRON.

No. 1 Gray	$24·50—4 m.
White and Mottled	23·50—4 m.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Sept. 27: The best brands of Virginia Car Wheel Irons have nearly all been sold. A few remnants of stock are held at furnaces, principally to supply local trade. Quotations remain as during the past week. There is a considerable stock of Cold Blast Charcoal Irons held here, of brands not well known, some of which are really desirable. These Irons are offered largely below quotations, as they must be sold. None of the furnaces show any disposition to blow in at present figures.

Virginia cold blast Charcoal Pig Irons	$30·00 @ 35·00
" hot " " "	28·00 @ 32·00
Va. hot blast Coke Pig Iron, No. 1 ex.	26·00 @ 27·00
" " " " No. 2 ex.	25·00 @ 26·00
" " " " No. 3 ex.	24·00 @ 25·00
Virginia Anthracite. No. 1 ex.	27·00 @ 28·00
" " No. 2 ex.	26·00 @ 27·00

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Sept. 27, writes us as follows: The market for the past week has been moderately brisk, but operations have been almost wholly confined to No. 1 Foundry Charcoal and Mill grades. Prices are exceedingly low, and the tone of the market very little if any firmer than heretofore. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores.	$25·00 @ 26·00
" 2 " " " "	23·00 @ 24·00
" 1 Mill, " " " "	22·00 @ 23·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores.	$23·00 @ 24·00
" 2 " " " "	22·00 @ 23·00
" 1 Mill, " " " "	21·00 @ 22·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
No. 1 F'dry, from Missouri Ores	24·00 @ 25·00
" 2 " " "	24·00 @ 25·00
" 1 Mill, " " "	26·00 @ 27·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	35·00 @ 40·00
" " Tennessee Ores	28·00 @ 30·00
" " Alabama and Georgia Ores	28·00 @ 30·00
Car Wheel from Kentucky Ores	28·00 @ 40·00

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, September 12, 1875.—*Metals.*—The week under review has been marked by no occurrences of special interest. Metals have, on the whole, stood their ground well, and the tendency, if anything, has remained upward. So far as we are able to judge from the statistical position of the various metals, we need look for no important fluctuations in the immediate future. The autumn campaign is opening everywhere under more reassuring auspices, and a fair amount of trade may be looked forward to at remunerative prices till the close of navigation of the more northern ports, when the usual dullness of winter may produce a lower ruling in some metals. Although occasional failures still occur in England, their causes are so well understood that the more confident feeling which has been spreading of late among European merchants and financial men is not shaken by these isolated individual cases. The apprehensions as regards the Eastern question which were entertained in August have in a measure disappeared. While they existed they did not unfavorably affect the leading metals; on the contrary, the reverse was the case, the government demand for them materially assisting in sustaining the improvement which had been gradually developing. *Copper* has improved still further, but by no means beyond its intrinsic value, when we consider the high cost of ores. A demand has sprung up for Manufactured Copper for Russia in England. We may here mention that Russia is not only consuming increased quantities of this particular metal, but of others, which is due to some extent to the more rapid development of general prosperity in that country since such an impulse has been given to railroad enterprise. Copper has been firm here in response to the English improvement. We quote, deliverable at Havre, Chili bars, 217·50; common ditto, 215; Ingots, 225; English tough cake, 225, and pure Corocoro ore, 217·50 francs. The metal is firmly held at Marseilles on the basis of 215 francs for small ingots. *Tin.*—The trade has been slow in adopting the more sanguine views which have obtained with respect to this metal, and there has been much hesitation on the part of larger operators ere they could be brought to lend it a vigorous support. Now, however, the better prospect that has opened is accepted without reserve. Here the transactions have been limited in extent, but prices remain quite firm. We quote Banca, deliverable at Havre or Paris, 237·50; Straits, 218·75, and English, deliverable at Havre or Rouen, 220; Straits and Billiton are at Marseilles, 215. *Lead.*—The demand, both in England and on the Continent, has remained brisk on the whole, a good deal being taken for Russia. Great firmness has been observable here, but the dealings have remained restricted. The arrivals at Marseilles have diminished of late, and as a consequence, great firmness prevails, the quotation being 55·50 to 56 francs. Prices have in sympathy therewith improved to 59 to 59·50 here. *Spelter.*—This metal would have been more active outside of Germany but for the reduced stocks. We have been quite firm, and quote, deliverable at Havre, Silesian, 65 francs, other good brands, 64, and ditto at Paris, 64·25. *Iron.*—Some speculation is reported from Luxembourg, where an advance of 3 francs in Pig Iron has been brought about. We should be glad if iron there were maintained at advanced rates, as the eagerness to compete with us from there would, in such an event, be somewhat checked. Unless general iron industry looks up we hardly dare hope that the improvement there will be of much duration. There is no change in values in France, and business on the whole remains quiet. *Coal.*—Firmness in France has been rather on the increase, and in coal for domestic uses an improvement can be reported. In the Pas de Calais the demand for refineries remains brisk, but at St. Etienne and in other localities, more dependent on iron industry, there is less buoyancy.

BELGIUM.

(*Revue Universelle*).

BRUSSELS, September 12, 1875.—*Iron.*—Flatness is still the prevailing feature in Belgium, notwithstanding the accounts received from some quarters of a revival, and the more frequent occurrence of orders received at the rolling mills. Prices remain rather unremunerative, due to the competition between leading establishments. Railroad material in general remains comparatively neglected, if we except that for tramways, in which there is a tolerable degree of activity. To judge from recent openings of tenders we are on the eve of an improvement in Rails. Some 50,000 tons have been taken for the Tirlemont, Diest and Togres line, of Antwerp, and 10,000 for Russia. It would appear from recent statistics that the Iron movement, both import and export in our country, has been decreasing in quantity; in Steel, on the other hand, our export is increasing, especially to Russia, Portugal and Spain. On the 25th proximo tenders will be opened for a large lot of both Iron and Steel Rails for the Palatinate. *Coal.*—Gradually the general situation improves; bottom has evidently been touched, and we may look forward to better times coming with some confidence. Coal is moving off steadily, and some companies are making preparations for an increased production. German Coal, which is of poor quality, begins to be discarded, and its competition is now of less importance. Consumers of Coal would, we believe, do well in now laying in a good supply. Preference will, at the next furnishing of Coal to the State railroads, in all probability be given to Liege over Charleroi.

GERMANY.

(*Borsenhalle.*)

HAMBURG, Sept. 11, 1875.—*Metals.*—Activity during the week has been kept in check, not so much by the lack of a demand as by the restricted available supplies. *Copper.*—Business has been limited, but the markets have remained quite firm. At Berlin the metal is well supported, and good English and Australian qualities have ranged between 89 and 91 marks. Here stocks have declined to a low ebb, and greater firmness has resulted therefrom without change in rates. We quote Drontheim 94 marks; Minnesota, 110; and Quincy, 100. *Tin* has continued to look up. Banca at Berlin commands 93·50 to 94, and English, 89·50 to 90, the 50 kilos. No change here. *Lead.*—This metal continues to attract the attention of purchasers. At Cologne the asking price is 22·30 to 22·50 marks, at the works, and even at this figure smelters are reluctant in making any engagements ahead. At Berlin, Tarnowitz, Hartz and Saxonian fluctuate between 23 and 23·50. At Stettin Spanish is nominally quoted 27, and German, 24 to 25 marks. We are more quiet here at the following quotations: German, 23·75 to 24·50; English Pig, 25·80, and Spanish, 26·10. A report is received from St. Petersburg that stocks have dwindled down to a low ebb. *Spelter.*—The metal remains in good position. Cologne quotes 24·50 to 24·75. At Berlin good qualities Silesian bring 24·50 to 25·50 marks the 50 kilos. The quotation at Stettin is 24 to 25. Here 500 cwts. have sold at 24·80, on the spot. Breslau remains firm without any fresh dealings to report.

HOLLAND.

(*Koch & Vlerboom.*)

ROTTERDAM, Sept. 14, 1875.—*Tin* is higher, and quite firm at the improvement. Banca, spot, sold at 52¼, and deliverable from the impending sale at 51½ to 52 guilders the 50 kilos. The fifth sale of the Trading Society will take place on the 29th instant, when 22,900 slabs Banca will be offered. The following has been the course of prices since the American war:

Banca Tin in Guilders.

	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875
1 Jan.	56	57¼	50¼	53	65	65	77	87¾	85¼	70	57¼
1 Feb.	57¾	55	52½	51¾	67¾	64¼	78	86	87½	70	57½
1 Mar.	57½	53¼	51¾	54	78	70	77¾	85	84	62	54
1 April	57	50	54	54	78¾	75¼	76¼	93	87	53	51¼
1 May	60	47¾	52¼	56	80	78	76¾	94	84	57	50¾
1 June	56	45	53	54¼	84	78¼	76	95¼	80	58¼	50
1 July	56	45¼	52¼	54¼	79	78¼	79¼	94¼	83¼	60	50¾
1 Aug.	55¾	47	53	55	79¼	69	80¼	96	79¾	56¼	48¾
1 Sept.	54¼	48	55	54¼	79¾	75	80	93¼	79	57	51
1 Oct.	55¼	46	55	57¼	76¼	74¼	80¼	94¼	74¼	56¼	
1 Nov.	58	46¼	53	59¼	72	73¼	81¼	92	72¼	58	
1 Dec.	58	48	54¼	59¼	67¼	73¼	88	87	67¾	58¼	

EAST INDIES.

(*Gilfillan, Wood & Co.*)

SINGAPORE, Aug. 6, 1875.—*Tin.*—Supplies have not been abundant, and last week transactions took place at $21·82½ per picul, and this week at $21·70. For New York there have been no fixtures. The Rosina was laid on, but has been withdrawn. The East Lomond has proceeded to Penang to complete her cargo. The Beugal is still loading. There have been no fixtures for Boston. Exports per Venetia *via* London to New York, 333 piculs; per East Lomond to New York *via* Penang, 770 piculs; per Cawdor Castle, same destination, 1054 piculs; per Altona, 666. Exchange has declined to 4/1⅞d. for first-class credits.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, ENG., Sept. 13, 1875.

THE INSTITUTE MEETING

at Manchester, last week, was a success in every sense of the word. There was a large attendance and, *mirabile dictu*, the weather was fine! which is something for Manchester to boast of. Mr. Menelaus, of course, presided, and there were present the mayors of Manchester and Salford, as well as the Bishop of Manchester. What the Bishop has to do with, or knows about, iron and steel it is difficult to say, but he was there and spoke. I may parenthetically remark that the Bishop, whose worldly cognomen is Fraser, is nearly ubiquitous, and is in all probability the most frequent speech maker in the United Kingdom. I cannot conscientiously aver that he is all things to all men, but I do certainly think that nothing comes amiss to him. The meeting, then, had the advantage of the episcopal breeches and gaiters, and also of the episcopal prayers prior to the commencement of business. The papers read were of a high class character, the first being that by Mr. Daniel Adamson, of Hyde Junction, Manchester, on "High Pressure Steam and its Application to Quadruple Engines." This paper you will doubtless reproduce in another part of this issue. Its author is a very clever practical man. The discussion, opened in May last, on the merits and demerits of the Howard boiler, was then resumed, and a somewhat warm interchange of opinions took place. A number of local works were afterward visited.

THE BOARD OF TRADE RETURNS

for August have just been issued, the total declared value of the exports for that month being £19,418,876, as against £20,503,756 in 1874, and £22,657,334 in August, 1873. There has been a decrease in the value or quantity of arms, coals and coke, iron and steel and steam engines. Particulars of the leading items are thus furnished:

IRON AND STEEL.

	Eight months ended 31st Aug. 1874. Quantity. Tons.	Value. £.	1875. Quantity. Tons.	Value. £.
Pig	452,064	2,256,576	622,168	2,347,060
Bar, angle, rod, &c.	152,702	1,906,811	177,469	1,803,891
Railroad	576,196	7,294,782	391,986	3,962,232
Wire	21,772	479,581	27,997	518,595
Armor plates, sheets &c.	98,152	1,804,141	130,828	2,158,021
Tin plates	78,283	2,395,621	96,649	2,695,797
Cast or wrought	173,599	3,437,364	162,274	2,971,016
Old for re-manufacture	30,203	177,414	11,694	58,366
Steel unwrought	19,833	780,179	20,129	725,281
Manufactures	6,149	535,210	7,250	543,390
Total	1,608,953	21,037,579	1,648,444	17,783,649

These figures show that although the quantity in the eight months of this year is 40,000 tons better, the money value is £750,000 lower.

HARDWARE AND CUTLERY.

These returns give the figures for the month and the eight months ending August 31st:

To	Month ended 31st August. 1874.	1875.	Eight months ended 31st August. 1874.	1875.
Russia	11,591	12,718	73,079	69,305
Germany	24,017	21,428	179,401	169,607
Holland	10,590	9,883	72,185	70,054
France	9,989	12,012	88,145	92,858
Spain and Canaries	8,222	8,375	73,741	63,174
United States	63,613	59,196	427,947	400,015
Spanish West India Islands	7,967	10,756	48,020	82,642
Brazil	21,220	20,681	170,886	192,443
Argentine Republic	10,141	6,927	96,485	71,815
British North America	33,404	17,444	174,489	200,288
British India	20,031	19,850	206,183	187,205
Australia	51,961	54,569	404,680	467,673
Other Countries	102,905	97,049	854,292	776,183
Total	375,651	350,888	2,868,543	2,843,262

COAL AND COKE.

The exports of fuel were on a larger scale than in 1874 to the extent of 100,000 tons, but the value was £180,000 less. The exact figures are:

To	Months ended 31st August. 1874. Quantity. Tons.	Value. £	1875. Quantity. Tons.	Value. £
Russia	181,009	158,290	192,549	134,336
Sweden and Norway	85,088	69,621	146,197	99,447
Denmark	61,710	45,720	79,977	45,174
Germany	243,164	180,601	276,721	158,860
Holland	41,083	35,141	55,031	37,811
France	262,930	147,255	249,960	144,203
Spain and Canaries	41,883	38,387	52,168	37,931
Italy	86,972	70,749	88,310	58,693
Turkey	46,133	40,292	20,699	14,543
Egypt	55,656	49,791	33,146	24,088
Brazil	20,534	20,498	39,076	32,047
Malta	24,932	22,860	31,853	23,337
British India	73,092	65,524	52,245	39,517
Other Countries	272,245	237,409	216,894	142,755
Total	1,436,421	1,171,138	1,534,826	992,642

Taken as a whole the returns afford unmistakable evidence of the slackness of trade, but they are still so fairly well sustained as to afford no reason for utter despondency.

THE SCOTCH IRON MARKET.

The Glasgow market was fairly firm during the greater part of last week, and toward the close of business there was an upward inclination in the price of warrants, 64/9 being the highest quotation reached. There was a steady shipping business done, 10,616 tons being the total set down for the week—a slightly higher aggregate than that for the corresponding week of last year. There are now 114 furnaces in blast in Scotland and 34 out, the stock at present actually in Connal's stores being 53,300 tons—an increase for the week of 2250 tons. Freights are unchanged, but some of the makers' brands are slightly stiffer, a fact which appears incongruous in the face of the continuous increase in the stocks.

Writing from Glasgow on September 10th (evening), Messrs. James Watson & Co. said: "We have to report a firm market for warrants during the week, the price having advanced from 63/ to 64/9, cash, closing to-day buyers at 64/6, sellers 64/7½. Shipments last week were 10,616 tons, against 9483 tons in the corresponding week of 1874.

	No. 1.	No. 3.
G. M. B., at Glasgow	65/	63/6
Gartsherrie, "	72/6	64/
Coltness, "	75/6	65/6
Summerlee, "	66/6	63/6
Langloan, "	73/6	64/6
Carnbroe, "	66/6	63/6
Calder, at Port Dundas	72/	63/6
Glengarnock, at Ardrossan	69/	64/
Eglinton, "	64/6	63/
Dalmellington, "	65/6	64/6
Shotts, at Leith	74/6	66/6
Kinnell at Boness	63/6	61/

Messrs. Wm. Colvin & Co. (Glasgow, Sept. 14th) report: "During the latter part of last week the warrant market fluctuated betwixt 63/9 and 64/9, closing on Friday at 64/6. On Monday there was a good business done at about 64/9, and to-day numerous transactions took place from 64/6 to 64/10½, closing with buyers at 64/9, sellers 65/. The value of makers' iron still tends upward, and for one or two brands in particular request high prices are paid. We quote:

Deliverable alongside.	No. 1.	No. 3.
G. M. B., at Glasgow	65/6	63/6
Gartsherrie "	71/6	64/
Coltness "	77/6	65/6
Summerlee "	66/6	63/6
Langloan "	74/	64/
Carnbroe "	66/	63/6
Monkland "	65/6	63/6
Clyde "	66/	63/6
Goven, at Broomielaw	66/	63/6
Calder, at Port Dundas	73/	64/6
Glengarnock, at Ardrossan	70/	64/6
Eglinton "	64/	62/6
Dalmellington "	65/	64/
Carron, at Grangemouth	65/	..
Carron, " specially selected	67/6	..
Shotts, at Leith	74/	66/
Kinneil, at Bo'ness	63/6	61/
Bar Iron	£8. 0/ to £8. 10/	
Nail Rods	£9. 0/	

SHIPMENTS.

	Tons.
Week ending Sept. 11, 1875	12,932
" Sept. 12, 1874	11,497
Increase	1,432

The current prices of Messrs. John E. Swan & Bros. (limited), same place and date, were:

Glasgow Brands.	Furnaces B'wing, 114	Furnaces Out 34.	Furnaces Built, 157.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	13	3	16	72/6	64/	..
Coltness	12	0	12	75/	65/6	..
Summerlee	6	1	8	66/	63/	63/
Langloan	7	0	8	74/	64/	64/
Govan	4	0	5	64/6	63/	62/
Calder	2	2	8	*72/	63/	64/
Shotts { Bess'mer	2	0	2	80/	..	..
Shotts { Ordinary	3	1	4	74/	66/	..
Carnbroe	4	2	6	66/	63/	63/6
Wishaw	2	0	3	..	..	..
Monkland	6	0	6	64/6	63/	60/
Chapelhall	3	0	6	68/	..	..
Clyde	5	0	6	65/6	63/	..
Quarter-Clyde	4	1	6	64/6	63/	61/

* f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 64/7½.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock	7	2	9	68/6	63/6	63/6
Ardeer	4	1	5			
Eglinton (Brand'n Eglint'n)	6	2	8			
Lugar	4	0	4	64/	63/	64/
Muirkirk	3	0	3			
Portland	5	1	6			
Dalmellington	6	2	8	65/	64/	60/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinneil	3	1	4	63/6	60/	58/6
Almond	2	1	3	63/6	60/	59/
Carron { Selct'd	3	3	6	67/6	..	..
Carron { Ordn'y				65/	..	..
Lochgelly	0	4	4	..	..	..
Lumphinnans	0	2	2	..	..	..
Bridgeness	0	2	2	..	..	..

ACTIVE CABLING COMPETITION

now appears to have set in—so much the better for a long suffering press and public. Now that the Direct United States Cable Company has got its cable laid, the Anglo-American Company have thought fit to bring down their rates. The direct company's charges are 2/ per word for day messages and 1/2 per word in the night to New York. The capital of this company is very little over one million and a quarter, while that of the Anglo company is seven millions, to meet the interest on which the average receipts are £430,000 per annum, so that it will require a great increase of traffic at the new rate of 1/ per word to make up dividends equal to the present. The public benefit by the reduction, in a degree which they can very well and readily appreciate, so that I do not see that I, a non-shareholder, should bewail the fact of reduced dividends. The new 1/ rate will come into operation on and after September 16th, but I will venture to prophesy that the companies will soon get tired and agree to a "mutual arrangement" for the "prevention of ruinous competition."

TRADES OF SHEFFIELD.

Pig iron has continued fairly firm during the week, in sympathy with the upward tendencies of prices in other districts. The quotations for Hematite pigs remains at the following figures: Maryport hematite, No. 3, 77/6; No. 4, No. 5, mottled, and white, 77/6; Bessemer, No. 1, 80/; No. 2, 77/6; and No. 3, 77/6 per ton; Millom Bessemer, No. 1, 80/; No. 2, 77/6; No. 3, 75/; ordinary, No. 3, 75/; No. 4, 74/; No. 5, 75/; mottled, 80/; and white, 75/—all on the customary four months' terms, or with an allowance of 2½ per cent. off for prompt cash. British hematite ores are quoted at purely nominal figures, which range from 21/ to 27/ per ton, but are not being sold in very large lots at present. The Lincolnshire iron ore district continues to be freely developed, mostly in the interests, or directly in the hands of the ironmasters of this district. The numerous furnaces of the Frodingham Iron Company, at Frodingham, are producing a large output, as also are those of the North Lincolnshire Smelting Company. At the Trent Works Messrs. W. H. and George Dawes, of the Milton and Elsecar Ironworks, new blast furnaces are being erected in order to increase the already considerable output of pig iron there. The Mid-Lincolnshire Iron Company are also getting ore near Frodingham, and are said to intend to put up furnaces, which is also the case at the scene of the operations of the Redburn Hill Company close by. The wagons from these places bring ores or pig iron from the furnaces or fields to South Yorkshire, and are returned with coal or coke—mostly the latter—as a reciprocatory load.

The general features of the local iron trade remain much as heretofore. There is little activity in any direction, and now that there is no likelihood either of a drop in the price of coal or ironworkers' wages, a reduction in iron seems wholly out of the question. Merchant iron is selling in small lots both in and out of the immediate vicinity, common bars being quoted at £8, or thereabouts, at the works here. The lower price of Low Moor iron has, as I anticipated last week, made no difference in the same direction with regard to ordinary qualities of finished iron.

It is stated that the directors of the Midland Iron Company, Limited, which has for some years paid the highest of all local dividends, have decided not to pay any interim dividend for the half-year just ended. The company is said to have made a profit, but owing to the costly machinery accident in the early part of the year which stopped the works for several weeks, coupled with the great depression of trade, the resolution I have named has been arrived at.

The chief feature of the week's trade occurrences has been the manner in which the coal owners have abandoned their proposal to reduce the wages of the whole of the miners in the district to the extent of 10 per cent. It will be remembered that about a month ago the members of the South Yorkshire and North Derbyshire Coal Owners' Association, Limited, met at their offices in Sheffield, and arrived at the determination that an immediate reduction in the miners' wages was absolutely necessitated by the exceedingly dull state of the coal trade. The secretary of the association, Mr. Parsonson, communicated this by letter to Mr. John Normansell, the secretary of the South Yorkshire Miners' Association, with a request that a deputation from the men would meet the Finance Committee of the Coal Owners' Association, in order to arrange what the amount of the drop should be. At this interview the masters announced that they required wages to be lowered by 10 per cent. from the net advances given since October, 1871, which, if conceded, would still leave the men in possession of 17½ per cent. higher pay than at the period named. The delegates submitted the matter to their constituents, and on the following Monday returned with the reply that they were not authorized to submit to any drop, but asked that the rate of wages which had been in force for the past four months should be continued forward by the agreement of both sides for a further period of three months. The owners took a week to consider what should be done under the circumstances, with the result that they held a large and influential meeting at Sheffield, on Monday, under the chairmanship of Mr. Robert Baxter, at which they decided to let the question stand over for the present. This resolution, of course, obviates any danger that might have existed of a collision between masters and men at the present juncture, but it has greatly elated the miners, who point out that their firm front has caused the employers to give way. On the other side, many of the coal owners think the attempt should have been made, in which case they think that the Miners' Association capital is so tied up by the purchase of the Shirland Colliery that success must have attended the measure. Personally, I believe that there has been a revival of business in the coal trade, consequent upon the approach of winter, sufficient to warrant the coal owners in letting the matter drop for the present.

Cutlery and files are quite unaltered.

STAFFORDSHIRE AND BIRMINGHAM.

In the Staffordshire district the millmen have in many instances gone out on strike against the proposed reduction in wages, some interruption to business being necessarily caused thereby. Many of the masters, pending the reforming of the conciliation board, have arranged to continue the old rate of wages to their men, in order to get their shipping orders out of hand before the closing of the Baltic and other northern navigations. Marked iron continues steady at £10 for bars, although inferior bars can be bought as largely as is desired at £7. 15/ to £8. The machinists are busy, as also are the principal branches of the hardware trades. A general advance of 10 per cent. is gradually being enforced on rim and mortise locks. Other quotations unchanged.

SOUTH WALES.

Cyfarthfa has now twelve puddling furnaces and three small mills at work, but none of the blast furnaces there are in operation. At Plymouth, also, nothing worth naming is being done. At Rhymney, a good order for rails on Swedish account is being worked off, and Ebbw Vale is shipping to France. The tin plate trade is dull and, the Llangennech Tin Plate Works are said to be likely to change hands shortly. The coal trade is moderately busy, but on the wages question the deadlock caused by the quarrel between Messrs. Vivian and McDonald continues.

THE METAL MARKETS

have been fairly strong, with a good amount of business. On Monday the sales in London were 200 tons good ordinary Chili bars, £81. 10/ to £82; 25 tons Urmeneta, £82. 5/; 30 tons Straits Tin at £81. 10/; 10 tons, September shipment, at £81. 7/6; 5 tons Australian, spot, at £80; 25 tons common Spelter, £24. 10/; 25 tons W. H., £25. 5/, and 25 tons special at outport at £24. 15/; Quicksilver, £11. 11/. On Tuesday nothing was done in Copper, Tin being quieter at £81. 5/ to £81. 10/, cash, for 20 tons Straits. On Wednesday there was no material change; on Thursday Copper was about 10/ dearer, 50 tons Straits, October delivery, being £82. 10/ to £83, Australian selling at £80. 10/ to £81. On Friday 100 tons Chili g. o. b. at £82. 5/5.

Messrs. Van Dadelszen & North say: "*Copper.*—The immediate effect of the large charters for the last fourteen days of August was to reduce quotation for Chili bars 20/, business having been done at £81. 10/; but the fall has almost been recovered, our present quotation being £82 to £82. 10/. In Australian small second-hand lots of Wallaroo obtainable at £92. 10/, the importer still not selling. Burra done at £89. 10/; English firm; tough, £90; India sheets, £94. *Tin.*—A fair business done. Straits declined to £81 for both spot and to arrive, but has recovered to £82. 10/ to £83, for spot, and £82. 10/ for arrival and forward delivery. Australian was sold to some extent from £80 to £80. 15/; and is now firm at £81 to £81. 10/, for spot, and £80. 10/ for distant delivery. In Holland Banca is quoted 52½ fl., and Billiton 50 fl. The trading company's next sale is advertised for the 29th inst., and to consist of 22,900 slabs Banca. English tin firm; £90 for common ingots. *Tin Plates* are unchanged in value, but in rather better demand. *Lead* steady, £23. *Spelter*, £24. 15/. *Quicksilver* has advanced to £11. 11/, at which a fair business has been done."

The *Mining Journal* remarks: *Copper.*—"This market has been stiffening throughout the week, and a fair amount of business has been concluded, at full rates; but there has hitherto been no important change in quotations. The price of copper ore, relatively with that of unwrought copper, leaves apparently no profit upon the latter, and the slightly enhanced quotations for manufactured are not such as to place this description of copper in a better position. Yellow metal is quiet, at 7⅜d. Chili bars, £82, cash, g. o. b.; special brands, £82. 5/ and £82. 10/. English tough, £88 and £89; best select, £90 and £91; India 4 by 4 sheets, £94. 10/ and £96; and strong copper, £97. *Lead.*—The firmness of this market still continues, and good soft English pig is not obtainable under £23 to £23. 5/, and soft Spanish, without silver, £22. 15/. *Spelter.*—The market is firm. Business in Silisian is reported—spot, £24. 10/; special, at outports, £24. 15/; and W.H., £25. 5/. *Zinc.*—A parcel of foreign has been sold at £28. 17/6., ex ship; also 50 tons London rolled, £28. 5/ and £27. 17/6. *Quicksilver.*—This metal has been without variation during the week. The last price at which business has been reported is £11. 11/. *Tin.*—Straits tin has been firm throughout the week, and a fair average business has been transacted. The price is improving, and the announcement that the Dutch Trading Company's sale, to be held on the 29th inst., is to consist of 22,900 slabs of Banca, appears to have afforded some further stability to prices. *Tin Plates.*—The market is very quiet, and the fact that the price of tin is advancing only renders makers less able to tempt buyers by submitting to further concession in quotations.

Messrs. Berger Spence & Co.'s circular to-day reports that *Copper* continues firm, and the recent advance is readily obtainable, holders of Australian refusing to entertain business under full rates. There is a fair business in *Tin*, an advance of 10/ per ton being required for October. *Spelter* firm and unchanged. *Lead* in good demand. *Tin Plates* offering freely, with little business reported.

Latest Liverpool prices are:

Iron: f. o. b. in Liverpool, per ton.

	£ s. d.		£ s. d.
Merchant bar	7 17 6	@	8 5 0
Merchant bar, in Wales	7 7 6	@	7 15 0
Staffordshire	8 10 0	@	11 15 0
Hoop	9 15 0	@	10 15 0
Sheet	11 5 0	@	11 15 0
Nail rod	8 15 0	@	9 5 0
Bar, best crown	8 10 0	@	8 15 0
Boiler plates	11 5 0	@	12 0 0

Tin Plates: f. o. b. in Liverpool, per box.

	£ s. d.		£ s. d.
Charcoal, I. C.	1 8 0	@	1 10 0
Coke, I. C.	1 2 0	@	1 4 6

Copper: Delivered in Liverpool, per ton.

	£ s. d.		£ s. d.
Bolt and Sheathing	93 0 0	@	94 0 0
Tile	88 0 0	@	90 0 0
Tough cake	87 0 0	@	89 0 0
Best selected	90 0 0	@	91 0 0

Scientific and Technical Notes.

Mr. Chas. Wood, in a paper read at the recent meeting of the British Iron and Steel Institute, on

FURTHER IMPROVEMENTS IN BLAST FURNACE HEARTHS,

states that the present types of furnace hearths and crucibles in use in the Cleveland district are large and very thick, and the thickness of the brickwork about the well and boshes retains the heat, and is in consequence burnt away rapidly, causing the furnaces to work badly through the blast not being sufficiently concentrated. It is proved that where the brickwork of the walls and well are thinner, the furnaces last much longer, and work more regularly, and that, where this system is in operation, furnaces are kept in blast as long as twenty years, whilst the Cleveland furnaces, after six or eight years, are said to require to be relined, and to have new hearths. The different systems of hearths are traced from the time when charcoal furnaces were the only ones in use, and where the hearths were all closed in, to about the year 1802, when the fore-hearth system was first brought into use, and when the slag was drawn off continuously, and the difficulties met with in each are all pointed out. Then follows a description of Algers' furnace, with an oval hearth, and furnaces with portable hearths, which were proposed to be removed when worn out, and new ones put in, also those which contained tuyeres, and everything complete, so that the furnaces were never blown out. Diagrams were shown of a hearth and boshes cooled by a water lining, which completely enveloped the furnace, and was intended to prevent the brickwork burning away, a system partly employed in cupolas. About 1860, closed hearths were first patented in England with thin walls round the hearth, and the slag was drawn off through a hole over the tapping hole. Mr. Barrett, of Norton, near Stockton-on-Tees, in 1862, filled his fore-hearths up with fire clay, and has ever since worked his furnaces with closed hearths, using in his large furnaces two tapping holes and two slagging holes, this being the first example of working coke furnaces in the North of England with a closed front. Mr. Hill, of Mr. Thos. Vaughan's furnaces at South Bank, followed soon after this by building up the fore-hearth with brickwork and recessing his tapping hole so as to be near the inside of the furnace, certainly a great improvement, and Mr. Dobbs, Mr. Hill's successor, has again improved upon this plan by separating his slag-hole from his tapping hole, using no dam plate, tymp, or fore-hearth. Next follows a description of Luhrmann's well known closed-hearth system, which consists of the hearth being built up continuously all round the well, the tapping hole having a recessed water plate for tapping, and a kind of tymp plate, having a round hole in it, into which is inserted a small tuyere, about one and a half inches in diameter, through which the slag is discharged continuously. This tuyere being in bronze, water-cooled, lasts many months, and the expense of working it is considered very little, when compared with the old open-hearth system, and at some furnaces it is working very successfully, but at the same time there are many where it has been abandoned through defective working, and through the prejudice of the men. It is pointed out that to ensure good working, blast furnace hearths should be preserved in form, that the boshes should not be allowed to burn away, and that the only way to do this is to keep the hearth cool by water blocks, and the boshes by thin walls, relying upon the air as a cooling medium. The use of water blocks being commented upon, and in proof of their durability, the president, Mr. Menelaus, has assured the author that twenty years' experience has proved their durability and safety, whilst the economy from the system is shown to be very great. Mr. Wood next follows with the description of a new hearth lately put in at one of the furnaces of the Tees Iron Works, which combines the closed-hearth system with an open fore part, and a new water plate arrangement over which the slag is drawn off, the effect of which is to confine the slag, and to prevent it burning away the brickwork or fire-clay through which it issues. The system adopted by Mr. Wood has been at work several months, and is giving great satisfaction to the furnacemen, whilst the economy in fire-clay, tools, and labor is said to be very great, and the make of iron at the same time is considerably improved.

We are frequently asked by correspondents and others for a description of, and a simple rule for,

ESTIMATING THE HORSE POWER OF A STEAM ENGINE.

We will endeavor to give the information as briefly and simply as possible:

When steam engines were first introduced they were largely used to take the place of the horses before employed for raising water from mines. Naturally, people asked when buying an engine how much work would it do, that is, how many horses did it represent. The early engine builders found themselves greatly at a loss when this question was first asked. They had at once, therefore, to determine how many horses an engine was equal to. The first thing was to find out how much a horse could do. The strongest English horses, the London brewers' horses, were very far above the best that could be found elsewhere. They were found to be able to travel at the rate of 2½ miles per hour, and work 8 hours per day. The load was pulling a 150 pound weight up out of a shaft by means of a rope. When a horse moves 2½ miles per hour he travels 220 feet per minute, and, of course, at this speed, the 150 pounds would be raised vertically that distance. That is equal to 300 pounds lifted 110 feet high per minute, or 3000 pounds 11 feet, or 33,000 pounds 1 foot high in one minute. This 33,000 pounds lifted one foot high every minute is taken as a standard horse-power. It is much more than any ordinary horse can do, and, therefore, the engine builders were always sure that their engines would take the place of fully as many horses as the horse-power would indicate that they should. Of course 33,000 pounds lifted one foot per minute is much more convenient for calculation than 150 pounds 220 feet, and, therefore, the former form has been adopted. The amount of work, or number of foot pounds, however, is just the same in either case. "A foot pound" represents the amount of power required to lift one pound one foot high. It is comparatively easy to estimate the horse-power of an engine with a reasonable degree of accuracy provided we know certain things in regard to it. We must know the pressure in the boiler, the diameter of the cylinder, the length of stroke, the number of revolutions per minute which the engine is making, and, lastly, the point at which steam is cut off.

When there is no cut off, the steam is admitted into the cylinder during the whole stroke, and a cylinder full of steam at boiler pressure is used at each stroke. In most engines, however, a whole cylinder full of steam is not used at each stroke, as steam is "cut off" before the piston has reached the end of the cylinder. If steam is prevented from entering the cylinder after the piston has passed the middle of the stroke, the point of "cutting off" is at half stroke. If the steam enters the cylinder during three-fourths of the stroke and is then arrested, the point of cutting off is three-fourths of the stroke. It is necessary to know the point of cutting off in order to find out what the average pressure is in the cylinder. In the commoner sorts of engines not provided with independent cut off valves, the point of cutting off may usually be taken at from one-half to three-fourths of the stroke, though sometimes more than this. It may, perhaps, be safe to take the average pressure in the cylinder at about eight-tenths of that in the boiler, though where the steam pipe is long and the throttle valve is used to control the speed, the average pressure in the cylinder may be no more than three-fourths of that in the boiler. The power will be the distance which the piston under this pressure travels during one minute. Therefore, we have the rule; multiply the area of the piston by the average pressure per square inch upon the piston, multiply this result by the distance which the piston travels per minute in feet, and the result is the number of foot-pounds per minute which that engine can raise. Divide by 33,000 and the result is the number of horse-power. The number of feet per minute traveled by the piston is twice the number of strokes per minute multiplied by the length of stroke. This gives the number of horse-power sufficiently near for all practical purposes.

In many parts of the country it is the custom of tinners before

PAINTING NEW TIN ROOFS

to allow the plates to become covered with a red tinge of iron rust. The explanation given of this neglect of the application of a preservative coating until the corrosion it is desired to prevent has begun, is that the paint sticks better to a surface slightly rusty than to one covered with bright tin. This is probably true enough, but we cannot but regard the delay as disastrous to the life of the roof, since the delay in painting until after the iron of the plates has begun to rust renders it impossible ever to protect the plates perfectly. When iron once becomes covered with a coating of red oxide or rust, there is no method now employed which effectually prevents further rusting of the metal. It is not plain to many how rusting may go on under a coat of paint, which is supposed to entirely exclude the air. All oils used in painting harden by absorbing oxygen from the air. The "pain skins" which form on paints or oils standing in the pots, are formed by a combination of the oil with the oxygen of the air. Iron rust, or iron oxide, is formed in the same way, by a combination of oxygen with the iron. The iron rust swells, or increases in bulk, just in proportion to the amount of oxygen which it absorbs. The tendency or affinity of iron for oxygen is very strong, so strong, indeed, that, after it once begins to rust, it will take oxygen wherever it can be found in substances in contact with the iron. When we apply an oil paint to a tin roof, we cover up the iron from the air and prevent it from getting oxygen from the air; but, at the same time, the paint is all the while taking oxygen from the air, and the rusting iron takes the oxygen from the paint—slowly, of course, but it goes on, and, as the rust increases in bulk, the paint is more or less loosened in its hold upon the plate, while the metal is, at the same time, eaten into holes. We do not know positively, but fear that much of the pitting of tin roofs may be traceable to this cause. Painting upon bright tin has its difficulties, but it can be done. The greasy crawling of the paint can be prevented by cleaning the roof, or, if the painter be sufficiently skillful, he may paint without any particular attention to the removal of the greasiness of the tin. If we must wait until the tin gets a reddish tinge before painting, it would be much better to lay the roof with black plates painted on both sides, and so save the expense of putting on the tin, which, as a protection, has to be destroyed by rust before the paint is put on.

Mr. William Robinson, of St. Petersburg, Pa., well known in connection with the invention of the

ELECTRIC SIGNALLING APPARATUS FOR RAILROADS,

has patented a new system which seems to be the best yet suggested. The current maintained through the rails sets in motion a mechanical diver which rings a bell on the engine when the track is clear. The apparatus is very simple and can be described without the aid of a diagram. A section of track a mile or two in length is separated from metallic contact with the sections at either end. At one end a battery is placed so that the wires from it connect with the rails, the negative pole being connected with one line of rails and the positive with the rails of the opposite line of the same track. At the opposite end of this insulated section a supplemental rail 30 to 60 feet in length extends along outside of the next section, but connected with the one before it. An electro-magnet upon the engine operates a bell. One terminal of this magnet is connected with the axle and the other with a metalic brush at the side of the engine, which, when the engine passing from one section to another, sweeps over the supplemental rail and completes the circuit. The bell immediately rings upon the engine and continues to do so as long as the brush is in contact with the rail, thus showing that the line ahead is clear. If, however, the track ahead is occupied by another train, its wheels and axles "short circuit" the battery, and the engine, on reaching the supplemental rail, does not receive the safety signal. That is to say, the current passes directly through the wheels and axles of the train, instead of taking the longer circuit through the supplemental rail and the magnet upon the following engine. If a rail is torn up the signal is not received. On both single and double roads the lines can be made to overlap in such a way that at each mile the engineer can also know the state of the track for the last two miles over which he has just passed. He is thus made aware of the presence of following, as well as preceding, trains. The bell is put up in such a way that the jarring of the engine will not cause it to ring. No line wires are used, and the trouble and expense attending them is not incurred. Neither snow, ice nor water upon the track can obstruct the working of this system, which seems to be the best so far brought before the public. It does away with the cumbersome and expensive signal apparatus usually necessary, and which in storm or fog are invisible, beside being constantly liable to derangement from a variety of causes.

A correspondent calls our attention to an instance of what he considers an

UNUSUAL LIFE OF LEAD SERVICE PIPE,

accompanying his letter with two sections cut from a pipe laid about the time croton water was introduced into New York, and which has been in constant use as a main service pipe ever since. A life of 33 years, however, is by no means unusual. M. Belgrand, in a paper presented to the French Accademy some two years ago, exhibited specimens of lead pipe laid in Paris in 1670, and after a service of 200 years it retained the marks of the sand mold in which it was cast. In the specimens before us the exterior is badly corroded, but the interior surface is apparently intact. During the third of a century in which it has been in use the diameter of the bore has rather diminished than increased, and in all probability not a trace of lead has been imparted to the water passing through it for all these years. This fact cannot, however, be taken as showing that Croton water does not corrode lead pipe, or that the poisonous salts of lead are not taken up by it. We have repeatedly seen lead pipes taken up after a much shorter service, which were fairly honey combed inside, and not at all oxidized on their exterior surfaces. We think it is the rule that the loss of weight in Croton pipes not exposed to direct contact with the soil, results chiefly from the loss from the inside. In the case of some pipes taken out of a house in West Twenty-sixth street, some years ago, the writer found that after something less than 7 years' service they had become so thin as to occasionally burst from the pressure of water in them. The main service pipe, originally 1¼ inches calibre and 1¾ inches outside diameter (A A), was worn so thin that in many places the shell was not more than one-sixteenth of an inch thick. The pipe when put in weighed about 5 pounds 12 ounces to the foot. When taken out it did not average four pounds. This may be an unusual case, but the other to which our correspondent calls attention is equally so. The long life of the pipe from which the samples before us were cut, is probably accounted for by the fact that it was laid about the time Croton water was first introduced into the city. At that time it was supposed that Croton water could have no corrosive action upon lead pipes. The reason was that the water, from contact with the vast extent of newly built masonry of the dams, reservoirs and conduits, took up a great deal of lime from the mortar and carried it in solution. The effect of this was to line the inside of the lead pipes with a crust composed of the insoluble carbonates of lime and lead, which became sufficiently thick to effectually protect the metallic surface from corrosion. The inside of the specimens sent us by our correspondent are thus coated throughout, which perfectly accounts for the protection of the surface. After the amount of lime in the water was reduced to a mere trace, this protective coating ceased to form, and the pipes laid three or four years later were subject

much the same conditions as those which now exist.

At Montgomery, Alabama, there is in operation

AN ICE MANUFACTORY,

in which a very interesting, simple and economical process is in operation. Seventy thousand gallons of water are used daily in the manufacture of 12,000 pounds of ice, the cost of which, when placed in the ice house, is about ⅝ of a cent per pound, which is cheaper than the freight from the lakes, if the ice was put on the cars gratis, besides the advantage of getting it in small quantities when desired, and being much cleaner and purer than lake ice. The distilled water is put in tin cans 30 inches long, 9½ inches wide and 2⅝ inches thick, which leaves the ice in convenient shape for handling. These cans are then placed in rows in tanks filled with salt water (though of course the salt water does not come quite to the tops of the cans so as to mix the distilled water which they contain), through which iron pipes conduct the ether. The ether is made in another room, and after being purified is pumped into a receiver and brought under a pressure of 70 to 110 pounds to the square inch, which liquidizes it. It is then forced through a small tube to a larger tube which opens into all the pipes in the tank (about 100 pipes in each tank); it then expands into a gas and fills all the tubes (its capacity for expansion being as 1 to 600). The ether extracts the caloric from the water which surrounds the tubes, thus equalizing the temperature, and bringing the whole below the freezing point; the distilled water freezing very readily, and the salt water being brought down several degrees colder than ice, yet without freezing. The gas passes on through the pipes and into a receiver, from which it is pumped into an ether holder, and again reduced to a liquid by pressure, which is facilitated by passing it through a long coil of pipe surrounded by cold water. It is then forced through the tubes again and performs the same work over. Some of the other gas pipes were covered with snow to the depth of three-quarters of an inch, collected from the surrounding atmosphere. It is very difficult to confine it, but if not allowed to escape the same quantity can be used continually. It is said to be much better than mercury, as the latter eats out copper pipes in a short time and iron pipes in about two years, while the latter does not affect the metals.

The cans are taken out one at a time and dipped into a vat of hot water, thus loosening the cake of ice, which then slips out, and the can is again filled and set in its place. This is done three times a day. These slabs of ice weigh twenty five pounds each, and four of them are piled on top of each other and allowed to freeze together, making 100 pounds to the block. These blocks are kept separate by placing small sticks between them.

Tools.

We have from time to time published extracts from Dr. Anderson's address upon tools, delivered at the opening of the Exhibition of Appliances for the Economy of Labor, at Manchester, England. We have now received a report in full of his remarks, and give all of them which are of any interest to our readers:

The word tool may be said, when taken in its broadest sense, to include every mechanical device that man has conceived and embodied in a material form in order to aid his own efforts in the accomplishment of his own purposes, more especially where the application of force is implied. They range from the first smooth stone used by the savage up to the self-acting mule or the Walter printing machine, including even the locomotive engine, or any other higher development; for through them all, from the smooth stone upward, one idea passes into another so gradually and imperceptibly that it is now impossible to draw a distinct line at any definite point, the conventional classification or nomenclature which is now employed being merely a matter of convenience to enable us to distinguish one sort of tool or device from another. The great point to realize clearly at the outset is this, that all mechanism, of whatever nature or by whatever name it may be known amongst men, is in each individual case the result of the material embodiment of an idea, that the original idea was first conceived in the human mind, and then by the means available at the particular period of the world's history man has been enabled to reduce the mental idea into a material, tangible form. According to Carlyle, the first tool used by the pre-historic man was a smooth stone, selected for a practical purpose, to be employed against his foe, or to aid him in killing wild animals for his daily sustenance. In course of time the idea would gradually dawn upon the mind of some other man of an ingenious turn, that if a long leather thong was attached to a stone, with the other end of the thong having a loop to pass over the right wrist, he could thereby save the trouble of having to look for and find the stone after each effort, and he could sit quietly under the shade of a tree in waiting for the prey, and hurl the stone without having to change position for its recovery; the assumed thong would thus be the first decided contrivance for the saving of labor.

Of the earliest invention of tools, or the first applications of mechanical force to perform work there is no existing record. Man's first effort with tools lies far beyond the reach of history or even tradition. The tool arts existed for thousands of years before Greece had reached the period of her artistic greatness; the tool art was ancient and mythical long before Romulus or Remus had been fondled; even far beyond the time when the Egyptian Pyramids were erected; for then tools were in a highly advanced stage, of which there is ample evidence. Those great works were not carried out by the apprentice hand of man. In searching for the origin of tools we have to go a long way still farther back—away up into the somewhat mythical region of our own old Fatherland, the home of the Aryan race, somewhere in Asia, where there is evidence that tools were familiar long before the Aryan swarms of colonists set out to people Hindostan, Persia, Greece and Rome, and nearly the whole of Europe. It is interesting to read the account of the ethnological investigations that have thrown light upon the condition of tools during that period. We read that the words relating to tools, industry and peaceful pursuits, to the domestic animals, to the weaving of cloth and the working of metals, have the same roots in the languages of all those nations, but that the words relating to war and most other subjects were originated by the several branches after the Ayran family had been broken up, thus showing that tools, the arts of peace and industry, must have been long established, otherwise the names of tools could not have been so firmly rooted in the minds of the entire race, to be retained in the memories of the whole stock in their respective colonies, when they, one by one, found a resting place in other lands, including even our own little island home. On reaching the times of Euclid and Archimedes we find tools highly advanced; the principles of tools are clearly understood, and about 130 years before the Christian era there is a pumping steam engine at work in the court-yard of Hero of Alexandria, the pump having an air vessel attached to produce a constant jet of water similar to the modern fire engine of John Vanderheyden. Both Pliny and Cicero refer to the tool called a lathe, but it is doubtful if they mean the lathe tool of our time; it is more than probable that they refer to the class of lathe which is now extensively employed in Birmingham for spinning sheets of metal into bowls or dish covers, but in those early days the sheet of metal seems to have been laid on the table of a sort of potter's wheel, which would afford the same result.

In the automatic or self-acting tools of this generation the great distinguishing feature of the larger number is this, that when once the tools are in working order they do not depend upon the attendant for the result. This condition is obvious in the tools of the textile manufactures, and almost equally so in the class of tools that are employed for the treatment of metal, wood and stone. In the latter, when considered in a general way, there is a family likeness running through them all, not so much in the outward appearance as in their principles of action, and still more in their adaptation to trace out the required form or pattern from a permanent copy embodied in the tool by a process of transfer. In the intelligent examination of such mechanism, the first thing to observe is the manner in which this leading feature has been developed, and it will be interesting to compare in each separate tool how the primary idea of copying the form has been embodied in the material structure, because this is the very point where a man shows his superiority for ingenuity, skill, craft or taste. Although the ways in which the idea of copying is embodied are innumerable, still it will be found that in almost each case the means employed are exceedingly simple.

To select, for example, the familiar tool called a lathe, it is chiefly intended to impart to materials true circles, straight lines, and flat surfaces, and all of those conditions must first exist in the tool. The bearing surface of the spindle neck must, in itself, be absolutely round in the strictest sense, otherwise the article operated upon will not derive a true circle from the revolution of the spindle. The mathematically true circle here referred to is practically very difficult to attain. There are many tools in the world that are supposed to be round, but which are not so in reality. An examination of the Whitworth gauges will best convey the idea of what is meant by mechanical truth and a true circle, each part fitting accurately into the other, yet perfectly free in every position. Then again the lathe has to afford absolutely straight lines of movement for the guidance of the cutting instruments, whereby the true circle derived from the spindle and dead center point is developed into a true cylinder, but not so unless the parent circle and straight lines are correct in themselves. If a perfectly flat surface is required from the lathe the cutting instrument must pass in a straight line transversely to the axis of the revolving spindle, and if the two are set absolutely at right angles to each other, a correctly flat surface is the result. If, however, any of the conditions of accuracy are wanting, then imperfection in the produce will follow as a matter of course. If the lathe is intended to afford screws it must first have a perfect screw within itself to copy from, for if there is any imperfection in the screw copy, or in the divisions of the teeth of the wheels by which it receives collateral motion, the screw produced will contain a transferred copy of each imperfection. It will thus be seen that the lathe is simply a tool to transfer its own character to other things; hence the paramount importance of having the lathe perfect in itself.

Unfortunately, the world, as a rule, does not sufficiently appreciate the difference between perfect tools and tools nearly perfect; but in the government of this portion of the world it is so arranged that those who do not are invariably punished because the want of truth and accuracy entails greater cost in their production, both at the present time and hereafter. To take another notable example—the well-known tool for planing metal—it is a sort of lathe, but differently arranged, and is intended chiefly for the transfer of flat surfaces; it is, however, frequently employed for the production of cylindrical surfaces, or even cones both figures being obtained on the same principle as in a lathe, namely, by combining, although in a different manner, the straight lines of the machine with the circles of some appendage on the table. As in the lathe, so in the plane, if the latter is not absolutely correct in itself, in all its lines or transferring surfaces, its productions will be imperfect also, and much more costly, if they have to be rectified by hand tools afterward. The family relationship that subsists between the lathe and the plane is very intimate; neither have much resemblance to their old ancestor, the Aryan potter's wheel, and still less does the lathe resemble its more immediate progenitor, the dead-center lathe, worked by the alternate motion of a wooden lath, which has given the family name to its many illustrious decendants.

Another member of the lathe family is the drilling machine. There are other tools of the same family, known by various names, in which the principle motion is given to the cutting instrument. They are variously arranged for movement in any required direction, vertically, horizontally or otherwise; but the leading feature in all is the copy from which the transfer movement is effected. In another class of tools the required form is embodied in a circular cutting instrument, which is guided unerringly by an iron arm, when the revolving cutter shapes out the reverse of its own form, as in cutting the teeth of wheels; but the circular cutter may be guided in any other course, regular or irregular, or the article may be simply passed under the cutter, and thereby rendered capable of developing any kind of figure which may be required in the whole range of the arts of construction. In all those tools, and in many others not mentioned, it is wholly a system of copying from a pattern by transfer, and the methods of applying the principle are practically unlimited.

The great lesson to be drawn from the consideration of this principle of transferring from a copy, where the tools merely repeat themselves, and thus become the parent of other tools of the same nature, is this, that the progeny of the said tools have the good or the bad qualities of the parent tool from which it was derived; that if the original tool has not truth inherent in its own structure, whether of true circles, straight lines or the many other tool virtues, then the tool cannot impart those virtues to other tools, nor is it possible for any real goodness to come out of a bad automatic tool. Hence the importance of having the highest excellence in the innate qualities of the breed; and where it does not exist in the stock naturally then the virtues can only be acquired by reverting to the more primitive class of hand tools. By means of hand labor, combined with extreme care, skill and patience, the sought-for conditions of truth are ultimately reached, and at a great expense; and the desiderated virtues once acquired and embodied in the automatic tool, will transfer themselves to other tools *ad infinitum*. After copying, the next important point to observe in machine tools is the instruments which men by experience have found the best adapted for treating different materials either by cutting or detrusion, and likewise to note the rate of motion at which the cutting or detruding operations are found to be most efficiently effected. The natural laws which determine the conditions here referred to are not clearly understood at the present time, but there is now an immense number of facts accumulated that point in a particular direction, but have not yet been generalized into laws.

One hundred years ago the cutting of cast iron was a secret which few men could practice. Cast iron appeared to be most obdurate in its resistance to the cutting instrument. From the circumstance that man's past experience had been acquired in the treatment of wood and the softer metals, which admit a high velocity, the earlier attempts to bore and turn cast iron on a large scale failed because the force was applied in a wrong condition. As experience was gained, it became apparent that a much slower velocity, combined with greater pressure, was necessary, which entirely overcame the difficulty. On one occasion, Mr. Bolton, in writing to his partner, James Watt, said, in effect, that the completion of the bore of a cylinder by a new boring bar was most satisfactory; the piston fitted so nicely throughout that there was scarcely room for the insertion of a half crown at the worst part. In these days of Whitworth tools we can scarcely realize their practical difficulties, which were overcome, one by one, through the skill and indomitable perseverence of Wilkinson and Murdoch.

The range of velocity found most suitable for different substances lies rather wide; cast iron, for example, requires a slower motion than wrought iron, and may be said to range between 12 and 20 feet per minute, according to hardness; sandstones, from their structure, require a slower motion in the planing machine when being shaped into blocks or columns, and a slower motion still is found necessary by the Aberdeen granite turner, where the action is detrusion and the edge of the detruding instrument or disc moves in unison with the granite column. Going in the other direction, the limit of speed has scarcely been reached; a velocity 8500 revolutions per minute is employed in the fine cutting of wood, and even that high speed is not found to heat the instrument to a degree which would necessitate discontinuance of the operation. It is different when the piece of wood itself is driven at that speed, as in the case of the wood turning, because from the friction exerted on one point only the temper would soon be taken out of the cutting instrument. The remarkable difference arises from the swift revolution of the cutting instrument, where two new conditions are found to step in. The first is that due to the extent of the cutting points on the circumference of the instrument, where each point acts in turn, thus giving a momentary rest to all the other points. Then, secondly, from the instrument whirling at such a high velocity, it is in the position of a blowing fan, and is thereby kept cool by the presence of the atmosphere.

There are some other minor points in tools beside those already mentioned, which are of great practical importance. When a good tool has been once completed, with all the cardinal virtues, then the question arises, has it the conditions of surface both in regard to extent and hardness that will enable it to see a reasonable old age and yet retain its original faculties, both in regard to truth and accuracy? Now tools differ greatly in this respect. Some tools make a fair appearance at the outset, but a few years' hard usage seems to take all heart and character out of them, while the properly constructed, sound surfaced tools, retain their excellence for a long period. The materials for tools chiefly consist of cast iron, wrought iron and steel. So far as the tool maker is concerned in fashioning them into form, the principle of copying by transfer is again the leading feature. A pattern is first made for the founder, which he imbeds in sand or other refractory material. When the pattern is removed the mold or empty space is filled up with the liquid metal, which runs into it by gravity. Beyond this it is almost entirely natural law which the founder has to study and obey in order to obtain good castings, and the founder's practice is chiefly derived from former experience of success or failure, which is just as true philosophy as that which is grounded upon the inductive theory of the thinker, and, as a rule, is equally reliable.

From a number of causes which were in operation during the previous 400 years, chiefly occurring in Italy, France, Germany and England, there begins the gradual dawning of a new era in tools; an entirely new race grew out of the old race, with this wonderful peculiarity and difference, that the idea or mental conception is not merely embodied in the material form, but, in addition, the man's own mental faculties are transmitted to and remain an integral part of the tool. By this change man relieves himself from the drudgery of having again and again to repeat himself. He is not only relieved from the physical toil of using the hammer or the distaff, or other tools, but he saves his mental labor as well. Thus the intellectual thinking of the brain becomes a part of the automatic machine. This second stage of tools embraces the larger portion of modern devices for the treatment of materials, including the mechanism of textile manufactures, and generally, but not necessarily, they derive their force through motors which are independent of man for their effect. It is useless to quote examples in Manchester, because they are the leading and distinguishing features of the district for spining, weaving and working of metals and wood. There is yet a third stage of a still higher order of capacity in tools. There are modern tools which not only have ideas embodied in them like the tools of the second order, but in addition they have what we may almost call a reasoning faculty; they have the capacity of putting several ideas together, then summing up the existing conditions, and arriving at a practical decision in a fraction of a second, a mental process which would occupy a learned philosopher for hours, even if furnished with all the facts of the case. Then there are other tools which are provided with a nervous system, which pervades their mechanism, whereby if any disorder of their normal condition occurs they instantly communicate the fact to a sort of brain and stop of their own accord. Other tools perform the most difficult mathematical calculations, and are capable of printing the result, so that no error may occur in the copying.

Railway Achievements.—There is a noticeable increase in the traffic on some of the great railways, and at times the capacity of the most extensive lines is severely tested. The Pennsylvania Division of the Pennsylvania Railroad, in addition to its numerous passenger trains, has recently been transporting an immense amount of freight. It is also stated in the Jersey City *Journal* that, on August 27th, "the largest day's work ever done on the New York division of the Pennsylvania Railroad was performed. Between the hours of 12, midnight Thursday night and 12, midnight Friday night, trains were run over the division as follows: Regular trains, east bound, 82; west bound, 81; or 163 in all. Extra trains, east bound, 86; west bound, 97; or 183; a grand total of 346 trains moved during the 24 hours. Of these trains, 106 regular and 102 extra trains were run through the Bergen Cut, 208 in all. This total shows that a train was run through the cut once every six minutes and a fraction over during the entire 24 hours. When it is considered that every one of the extra trains was handled by telegraph, and guided to their journey's end by this means, the wondrous perfection of the system pursued on the road is observable. During those twenty-four hours 3089 freight cars were moved on the division—1598 east ward and 1491 westward. Of these, 2523 ran past Monmouth Junction—1277 eastward and 1246 westward. The others were local cars, or were run to stations east of the junction. Beside all these cars there were 275 peach cars moved east, and to an uninitiated observer it seems impossible that such an enormous network of trains could be run on any road without disaster or accident; but when the uninitiated become initiated into the mysteries of the system of running the trains practiced on the road, astonishment would vanish and admiration grow."

We also learn that on the 2d instant a still greater amount of service was performed with a smaller number of trains, as 3117 freight cars were moved with 331 trains, the number of cars being 38 greater than on the 27th ult., and the number of trains 15 less.—*Railway World.*

Messrs. Graff, Bennett & Co., of Pittsburgh, have lately placed on exhibition some remarkable specimens of sheet iron made by them. The iron is said to be completely decarbonized, perfectly malleable and very tough. Their remarkable feature is their extreme thinness, ranging from 1350 sheets to the inch to 7500 sheets, and made between rolls used in making plates weighing more than a ton each.

A fire at Pittsburgh, on the morning of the 16th instant, seriously damaged Taylor's scale works, Hogan's pump factory and the Old Novelty Works of J. K. Morehead & Co. The uninsured losses are not heavy in either case.

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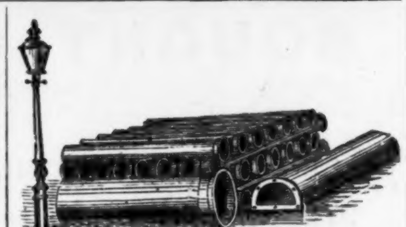

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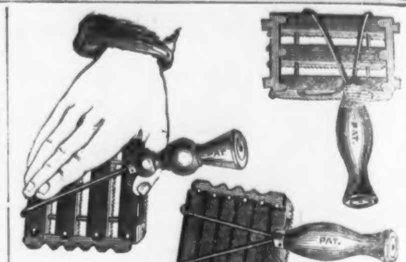

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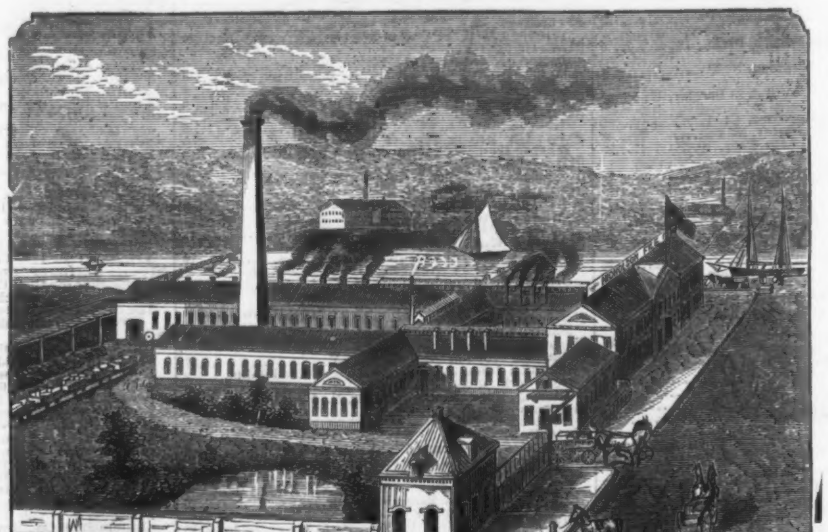

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Eighth.—The large stock carried by us, combined with our superior facilities, enables us to fill the largest orders at the shortest possible notice.

Ninth.—We are constantly making careful tests of our Files by delicately constructed machinery, which **automatically records** the **actual power applied,** forward, backward and downward, at each stroke of the File, also the number of strokes, combined with the work performed, enables us not only to judge of the **quality of our Steel for wear,** but **also of the cutting qualities** of the File, and the ease (expressed in pounds) with which a given amount of work can be accomplished.

Finally.—Our Files **are warranted** to be **hard, well cut** and **sound.** They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of **our ability to furnish a good article cheap,** is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

NICHOLSON FILE COMPANY, Providence, R. I.

SOLD BY HARDWARE DEALERS GENERALLY.

SUPPLIES
FOR
Railways, Machinists and Amateurs,

Gum and Leather Belting, Packings and Cotton Waste, Babbit Metal.

FINE TOOLS

for Machinists and Amateurs; Barnes' Foot Power Scroll Saw; Foot Lathes all kinds. Sole Agents Baxter Steam Engine. Iron and Wood Working Machinery. Send for Price Lists.

JACKSON & TYLER,
16 German St., Baltimore, Md.

COX & COX,
Counsellors at Law,
229 Broadway, NEW YORK.
Practice in cases relating to
PATENTS and TRADE MARKS.
Before the
Courts and Patent Office.

Burke & Fraser,
SOLICITORS OF
PATENTS
37 PARK ROW, N. Y. CITY.
Established 1851. *Also Consulting Engineers.*

PATENTS.
Send for circular.

Thomas D. Stetson, No. 23 Murray St., N. Y. Solicitor of Patents, and Scientific Expert in patent cases.

B. KREISCHER & SON.,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,

Established 1845.

Office, 58 Goerck Street, cor. Delancy Street

East River, New York.

The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand, from my own mines at New Jersey and Staten Island, by the cargo or otherwise.

Watson Fire Brick Manufactory

ESTABLISHED 1836.

JOHN R. WATSON Perth Amboy New Jersey
Manufacturer of

FIRF BRICK,

For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c.

FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE

NEWTON & CO.,

Successors to

PALMER, NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK
Stove Linings,
Range and Heater Linings
Cylinder Brick, &c., &c,

PEEKSKILL FIRE BRICK WORKS.

Established 1831.

HORTON & MABIE,

Manufacturers of

Fire Brick of all kinds,

STOVE AND RANGE LININGS

of every description. Linings for Cupola or Foundry Furnaces. Blocks, Tiles, McKenzie Cupola Brick, &c.

FIRE CLAYS, FIRE SAND & FIRE CEMENT.

BLACK LEAD

CRUCIBLES.

Manufactured by

ADAM NEWKUMET,

1537 & 1539 N. Front St., Phila., Pa.,

For Steel, Brass, Nickel, Copper, Bronze, &c.

Equal to any in the market, and all guaranteed. ☞ Keeping a full stock of all sizes on hand, and being confident of giving *entire satisfaction* we respectfully ask consumers to give us a trial.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK
And Furnace Blocks,
IN ALL ITS BRANCHES.

Woodbridge, - - - N. J.

National Fire Brick & Drain Pipe W'ks,

CHAS. ANNESS & SONS, Props.,

Manufacturers of **FIRE BRICK** all shapes and sizes.

Miners and Shippers of all kinds of **FIRE CLAY.**

Factory at SPA SPRINGS, on Perth Amboy and Woodbridge, R. R.

Post Office address, ***Woodbridge, N. J.***

TROY STOVE LINING
AND
Fire-Brick Works.
BELL & BACON.

Stove Linings a Specialty. TROY, N. Y.
JAS. C. BELL, JR. J. BLUNT BACON.

Established 1845.

WOODBRIDGE, N. J.
Fire Brick Works.
WM. H. BERRY & CO.

Manufacturers of all forms and sizes of **FIRE BRICK,** for Blast Furnaces, Rolling Mills, Gas House and Oven Tiles, and Stove Linings, made to order. Also, Fire Clay, Kaolin, Sand and Fire Mortar.

A. H. SPENCER,
Solicitor of Patents,
And Expert in Patent Cases.

28 State St., Room 19, Boston.

HOWSONS'

OFFICES FOR PROCURING

UNITED STATES AND FOREIGN

PATENTS,

Forrest Buildings

119 SOUTH FOURTH ST., PHILADELPHIA.

AND MARBLE BUILDINGS

605 Seventh St. (Opposite U. S. Patent Office.

Washington, D. C.

H. HOWSON, Solicitor of Patents. | C. HOWSON Attorney Law

Communications should be addressed to the **PRINCIPAL OFFICES PHILADELPHIA.**

HENRY DISSTON & SONS,

Keystone Saw, Tool, Steel and File Works,

Front and Laurel Streets, Philadelphia.

Branch Works, Tacony, Philadelphia. **Branch House, Randolph & Market Streets, Chicago, Ill.**

Our Celebrated CROSS-CUT AND WOOD SAWS.

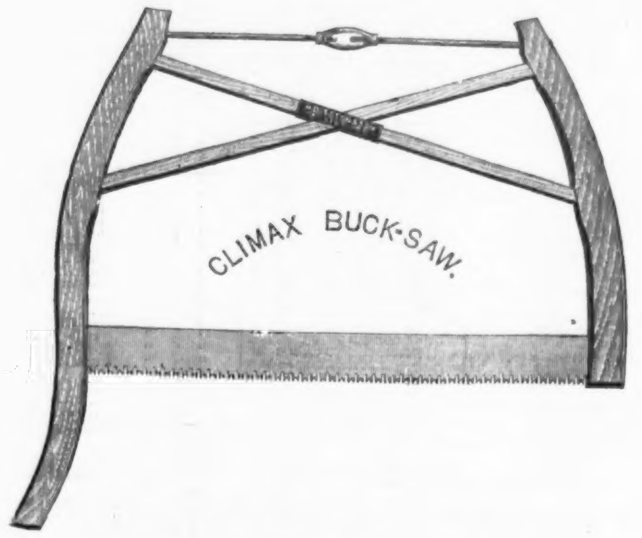
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag,*" which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

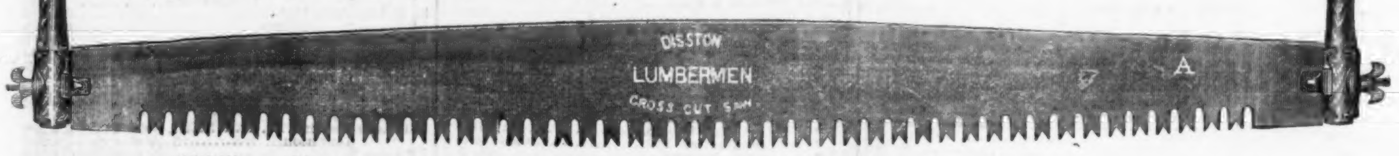
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"

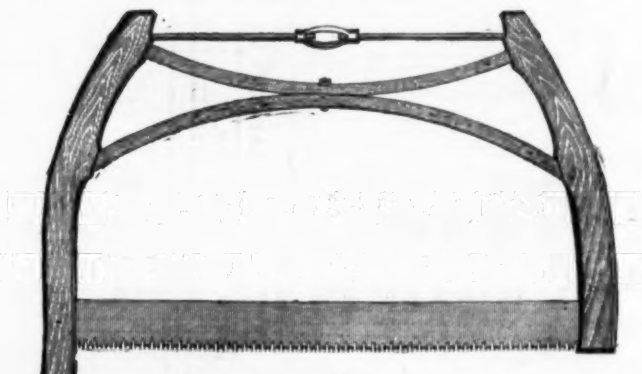


THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.





"ARCH FRAME" WOOD SAW.

THE CLIMAX.

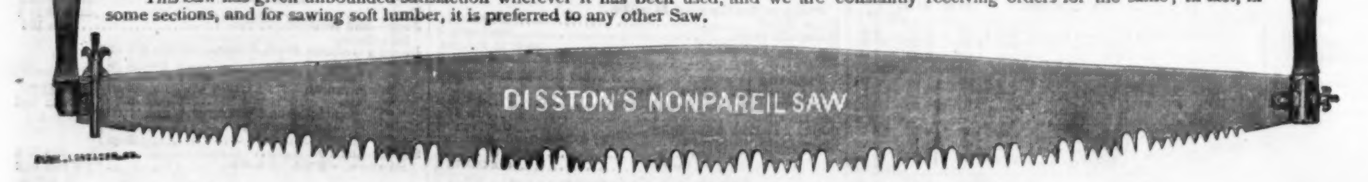
The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.

THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

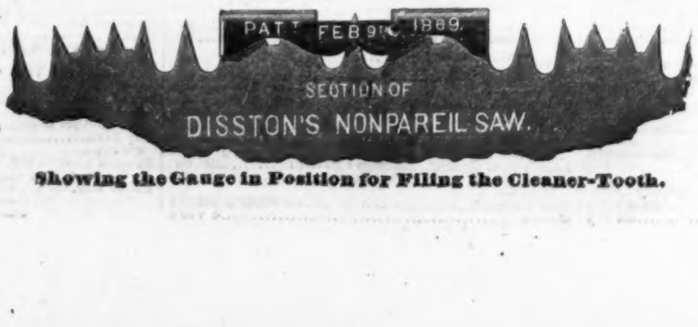
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



DISSTON'S WOOD SAW FRAME.

GAUGE FOR REGULATING CLEANING-TEETH.

The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting-Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting-Teeth, the Cleaning-Teeth projecting through the opening in center of Gauge. Reduce the projecting points by means of a File, until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.



Showing the Gauge in Position for Filing the Cleaner-Tooth.

New York Wholesale Prices, September 29, 1875.

HARDWARE.

Anvils.
Solid Cast Steel ... ⅌ lb 14c
Wright's ... ⅌ lb gold 11c; over 250 lbs 11½c, gold
Armitage's Mouse Hole ... gold 10c
Wilkinson's ... ⅌ lb gold 11c
Eagle Anvils ... ⅌ lb 8c

Apple Parers.
Domestic, Turn Table, Lightning, Hudson's, Reading, Union ... $7.75 ⅌ doz
Skeleton Paring, Coring and Slicing ... $5 00 ⅌ doz net
Bay State, Paring, Coring and Slicing ... $15 00 dis 10 %
Climax Slicer ... 8 00

Augers and Bits.
Conn. Valley Mfg. Co., Douglass, Ives', Beecher (French, Swift & Co.), Griswold, Challenge ... 1st quality ... dis 40&10 %
Nobles Mfg. Co. ... dis 40 @ 40&5 %
Cook's ... dis 40&10 %
Diamond Hardware Co. ... dis 25&10&10 %
Snell Mfg. Co. ... dis 35 %
Jennings' Bits ... dis 25 %
Lewis Single Twist Bits ... dis 20 %
Andrews' Bits ... dis 30 %
Griswold's Patent Bits ... dis 20 %
Expansive Bits, Clark's ... small, $18; large, $26—dis 15 %
" " Ives' ... $20 @ $30—dis 40 %
" " Blake's ... $20—dis 40 %
Hollow Augers, Douglass', Ives', French, Swift & Co. ... dis 40 %
" " Bonney's Adjustable ... ⅌ doz $48—dis 25 %
" " Stearns' ... ⅌ doz $48—dis 25 %
" " Ives' Expansive ... each $4·50—dis 40 %
" " Universal Expansive ... each $4·50—dis 15 %
Gimlet Bits—Screw, $1·50; no screw ... dis 20&10 %
Double Cut Gimlet Bits, Shepardson's ... dis 45&5 %
" " Ct. Valley Mfg. Co. ... dis 25 %
" " Hartwell's ... dis 25 %
" " Douglass ... dis 25&10 %
" " Ives' ... dis 20 %
Morse's Bit Stock Drills ... dis 20 %
L'Hommedieu's Ship Augers ... dis 20 %
Watrous Ship Augers ... dis 20 %
Vaughan's Post Hole—6 in. $13 60; 7, 8 and 9 in. $25 per doz ... dis 20 %

Awls, Bead Sets, &c.
Awls, Sewing ... per gross $1·20—dis 15 %
" Shouldered Peg ... per gross $2·00—dis 15 %
" Patent Peg ... per gross—dis 15 %
" Shouldered Brad ... per gross 2·25—dis 15 %
Brad Sets, Aiken's, No. 42, $10·50; No. 43, $12·50 ... dis 45&10 %
" Clark's ... dis 25 %
" Stanley's Excelsior ... $18 50—dis 50&10 %

Axes.
Brook's ... per doz $12 00 @ 14 00 net
Hood's ... per doz $15 00 @ 16 50—dis 20 %
Hunt's ... $12 00 @ 14 00
Collins' ... ⅌ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) bron'd or red ... ⅌ doz $10 00 net
Hurd's ... ⅌ doz 12 00 @ 14 50
Simmons' ... ⅌ doz 11 00 @ 15 50
Morris' ... ⅌ doz 11 00 @ 13 50
Red Jacket ... ⅌ doz 12 00 @ 13 50
Mann's ... ⅌ doz 11 00 @ 13 50
" Double Bitted ... ⅌ doz 11 50 @ 12 00
Underhill's ... ⅌ doz 12 00 @ 15 50
" Crown ... ⅌ doz 12 00 @ 15 50
John Leverett's
Ten Eyck ... ⅌ doz $10 @ 13 00 net
M. H. Jones & Co. ... ⅌ doz 10 50 @ 11 50 net
Nobles Mfg. Co. ... per doz $10 50, net
Elephant ... per doz $10 50 @ 11 50 net

Axle Grease.—Frazer's ... ⅌ lb 5c.

Balances.
Scales ... new list dis 50&5 %
Iron ... new list dis 25&5 %
Brass (Plated list) ... dis 50 %
Spring ... new list dis 50&5 %

Bells.
Hand, Light Brass ... dis 70&10 %
" Extra Heavy ... dis 40&10 %
" White Metal ... dis 40&10 %
" Silver Chime ... dis 50&10 %
" Swiss ... dis 25 %
" Globe (Cone's Patent) ... dis 25&10 %
Gong Abbe's ... dis 25 %
" Yankee ... dis 30 %
" Barton's ... dis 25 %
Crank, Taylor's ... dis 35 %
" Brook's ... dis 30 %
" Cone's ... dis 25 %
" Connell's ... dis 20 %
Lever, Sargent's ... dis 30&10&10 %
" Taylor's ... dis 35 %
" Hart, Bliven & Mead Mfg. Co. ... dis 50&10 %
Pull ... dis 35 %
" Brook's ... dis 30 %
" Western ... dis 25 %
Cow—Common Wrought ... dis 50&10 %
" Western ... dis 60&10 %
" Sargent's ... dis 50&10 %
" Kentucky "Star" ... dis 50&10 %
" " Sargent's ... dis 20&10 %
" Dodge's Genuine Kentucky, new list—No. 0 1 1½ 2 3 4 5 6 Hog ... dis 45 %
" Yaw's Genuine ... dis 35 %
" Texas ... dis 35 %

Bellows.
Blacksmiths', Common, List of Sept. 15 ... dis 15 %
" Extra and Pittsburgh Pattern ... List net
Moulders' ... dis 40 %
Hand Bellows ... dis 60 %

Blind Adjusters.—Domestic ... ⅌ doz $2—dis 20 %

Blind Fasteners.
Mackrell's ... dis 30 %
Van Sand's ... dis 30 %
Washburn's Patent ... ⅌ gross $14 net
Merriman's ... new list net

Blind Staples.
Boardman's Patent, ¾ in. and larger ... ⅌ lb 21c
" ⅝ in ... 42 c

Blocks.
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list ... dis 30 %
Burr's ... dis 30 %
Stanley Rule and Level Co. ... dis 25&10 %

Bolts.
Cast Iron Barrel, Shutter, &c. ... dis 60&10 %
Cast Iron Chain ... dis 50, 10&10 %
Wrought Iron Barrel ... dis 50, 10&10 %
" " Square ... dis 50, 10&10 %
" " Shutter ... dis 50, 10&10 %
Wrought Iron Flush, Stanley's ... dis 40 %
" " " Sargent's ... dis 25 %
Carriage and Tire, Common ... dis 75 %
" " Norway Iron ... dis 50&10 %
" " R. B. & W. ... (old list) dis 40 %
" " Philadelphia ... dis 60 %
" " Shelton's ... (old list) dis 60 %
Union Nut Company, old list ... dis 60&10 %
Stove ... dis 50 %
" R. B. & W. ... dis 40 %
" Shelton's Shaved Head ... dis 50 %

Borax ... ⅌ lb 30c

Boring Machines. Upright. Angular.
Hovey's, no Augers ... $2·75 $3·00 net
" with Augers ... 3·00 4·00 net
Douglass', no Augers ... 2·25 4·00 net
" with Augers ... 3·50 4·50 net
Parr's, no Augers ... 7·50 10·00 dis 20 %
Kellogg's, no Augers ... 2·25 3·75 dis 15 %
Sweets'
Snell's ... 4·75 6·00 dis 15 %
Phillips', with Augers
Morticing Machines, each ... dis 30 %

Bow Pins.
Union Nut Co. ... new list dis 50&10&5 %
Hotchkiss' ... dis 50&5 %
Humason, Beckley & Co.'s ... dis 50 %
Sargent & Co.'s ... dis 50&10&10 %

Braces.
Barber's Patent ... dis 40&5 %
U. S. Jackson ... dis 40 %
Wilson Mfg. Co. ... dis 40 %
Spofford's Patent ... dis 40 %
Noble's Patent ... dis 50 %
Ives Novelty ... dis 40 %
" Hamden
Common Ball (American)

Brackets—Shelf ... dis 60&10 %

Bright Wire Goods ... dis 65&10&10 %

Bull Rings.—Union Nut Co., new list, dis 50&10&5 %
Serge ... dis 50 %
Hotchkiss' ... 3⅞ in. ⅌ 25 net

Bung Hole Borers.
Common and Ring ... dis 20&10 %
Ives' Pat. Borers ... dis 25 %
Enterprise Mfg. Co. ... dis 20 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co. ... dis 30&10 %
Bradley's
Beatty's
Nos. 1 2 3 4 5 6 7 8
$19·20 $21·00 $24·00 $27·00 $30·00 $33·00 $36·50 $41·00
Hart Mfg. Co. ... dis 25 %
Nos. 1 2 3 4 5 6 7 8
$25·25 $29·75 $34·25 $38·75 $42·25 $49·50 $54·00

Butts.
Wrought Brass ... dis 33⅓ %
Cast Brass ... dis 25 %
Common Cast, not Drilled.
Fast Joint, Narrow ... New list July ... dis 30&10 %
" Broad ... dis 30&10 %
" Jap'd ... dis 30&10 %
Loose Joint, Narrow and Broad ... dis 30&10 %
" Jap'd ... dis 30&10 %
Parliament Butts & Mayer's Hinges ... dis 40&10 %
Loose Pin ... dis 40&10 %
" Japanned ... dis 40&10 %
" Plated Tips ... dis 30&10 %
Drilled and Wired.
Fast Joint, Narrow ... New list July 1, dis 25&10 %
" Broad ... dis 25&10 %
" Jap'd, with and without Acorns ... dis 40&10 %
Loose Joint ... dis 40&10 %
" Jap'd with and without Acorns ... dis 40&10 %

Parliament and Mayer's Hinges ... dis 35&10 %
Loose Pin ... dis 40&10 %
" Japanned ... dis 50&10 %
" Plated Tips ... dis 35&10 %
Union Mfg. Co., Figured Enameled L. J. ... dis 55&10 %
Union Mfg. Co., Nickel Pl. L. J. Capped Iron and Bronze ... dis 33⅓&10 %
" " Boston Finish, Plain, without Acorns ... dis 30&5 %
" " Boston Fin., with Iron Acorn ... dis 25&10 %
" " " Silvered ... dis 65&5 %
Wrought Iron.
Fast Joint, Narrow, Lt. and Regular ... dis 40&10 %
" Broad ... dis 40&10 %
Loose Joint, Narrow and Broad ... dis 40&10 %
Table Butts, Back Flaps, &c. ... dis 40&10 %
Inside Blind, Regular ... dis 40 %
" Light ... dis 40 %
Loose Pin, Wrt. ... dis 40&10 %
Am. Spiral Spring Butt Co., list May 1st ... dis 25 %
Union Spring ... dis 25 %
Blind Butts, Parker ... dis 25 %
" Palmer ... dis 40 %
" Seymour ... dis 40 %
" Shepard ... dis 60 @ 60&10 %
" Lull & Porter ... dis 60 %
" Nicholson ... dis 65&10 %
" Huffer ... dis 33⅓&10 %
" Garretson, No. 1 ... dis 60 %
" Clark's, Nos. 1, 3 and 5 ... dis 65&10 %
" Clark's No. 2 ... dis 65&10 %
" " Nos. 2, 4, 4½, 6, 8, 10 ... dis 60 %

Caps.—Percussion, per 1000.
G. D. ... 37 @ 40c
Ely's E. B. ... 1-4s, 38c.; 1-10s, 75c. gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52 ... gold
Colt's ... 1-10s 80c gold

Carpet Sweepers.
Union ... each $3 75 net
Welcome ... each $3 75 net

Cartridges.—Metallic ... dis 35&5 %

Cards.—Horse and Curry ... dis 30&10 %
Cotton ... dis 15&10 %
Wool ... dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished ... per doz $3·00 dis 20 %
Cast Iron, Steel Points ... per doz $2·00 dis 45&5 %

Casters.
Bed ... dis 30&10 @ 40 %
Plate and Shallow Socket ... dis 35 @ 40 %
Deep Socket ... dis 35 @ 40 %

Cattle Leaders ... new list dis 60&10 %

Chain.
English Coil ... net gold
⅌ lb ... 11¼ 8¾ 7¾ 7¼ 7½ 7c
3-16 ¼ 5-16 ⅜ 7-16 ½
Trace, 6½-10-2 ... by the cask, ⅌ pair, gold 50c
Trace, 7-10-2 ... by the cask ⅌ pair gold 53c
German Halter Chain ... dis 35 %
German Coil ... dis 25 % gold
Galvanized Pump Chain ... ⅌ lb 18c
Jack Chain, Iron ... dis 50 %
" Brass ... dis 50 %

Chalk.
White ... ⅌ gross, 57c net
Red ... ⅌ gross, 90c net
Blue ... ⅌ gross, $1·00 net
White Crayons ... ⅌ gross, 16½c net

Chisels.
Socket Framing, Douglass, Extra ... dis 60&10&10 %
" Crossman ... dis 50&15&10 %
" Buck Bros. equivalent to dis 50&17½ %
" Hart Mfg. Co. ... dis 50&10 %
" Merrill ... dis 50&10 %
" Firmers, Douglass, Extra ... dis 60&10&10 %
" Crossman ... dis 50&10&10 %
" Buck Bros ... equivalent to dis 50&17½ %
" Hart Mfg. Co. ... dis 50&5 %
" Merrill ... dis 50 %
Socket Corner ... dis 25 %
Tanged Firmers ... dis 40&10 %
" Butcher's ... $5·50 to £ gold
" Newbould's ... $5·50 to £ gold
" Spear & Jackson's ... $5·50 to £ gold
" Buck Bros (Shank) ... $5·50 to £ gold

Clamps.
Cabinet ... dis 60&10 %
Carriage ... dis 50 %
Hartwell's ... dis 25 %
Lambert's ... dis 25 %
Providence Tool Co. ... dis 25 %

Clips, Axle.
Norway or Best ... dis 40 %
Superior ... dis 65&10 %
"Star," Superior Philadelphia ... dis 45&5 %

Coal Shovels.
Edgar's Pat. "Gem," Short and Long H'dled ... dis 10 %
Iron Handled ... ⅌ doz, 1 00 @ 2 00
Wooden Handled ... ⅌ doz

Coal Hods.—Smith, Burns & Co. ... dis 15 @ 25 %
Nos. 14 15 16 17 18 inch.
Japanned ... $6·00 6·35 6·75 7·50 8·00 per doz
Galvanized ... 7·50 10·00 10·75 11·50 13·00
Morning Glory Funnel Hods—Nos. 15 16 17
Japanned ... $9·00 10·50 12·00 per doz
Galvanized ... 12·00 14·50 16·00
Sidney Shepard & Co.'s new list ... dis 10 %

Cockeyes ... 1¼ in., 28c.; 1½ in., 33c.; 1¾ in., 37c. net

Cocks.
Brass Racking ... dis 35 %
Lock and Globe ... dis 35 %
Lever Bibbs ... dis 35 %
Ale and Beer ... dis 25 %

Coffee Mills.
Board and Box ... dis 15 @ 20 %
Brighton ... dis 20 %
Increase Wilson's ... dis 25&10 %
Selsor's Pat ... $9·50, $10·50—dis 20 %
American (Enterprise Mfg. Co.) ... dis 25 %
French Steel ... dis 20 %
The Swift ... dis 20 %

Compasses and Dividers.
Bemis & Call Co.'s ... dis 25&10 %
Cook's ... dis 25 %
Excelsior ... dis 40 %
Peck Stow & Wilcox ... dis 25&10 %
Miller's Patent ... dis 20 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %
Barton's ... dis 15 @ 20 %
L. & I. J. White ... dis 20 @ 25 %
Swan & Brombacher ... dis 25 %

Corkscrews ... dis 25 %

Corn Knives and Cutters.
Bradley's ... dis 10 %

Crow Bars.
Cast Steel ... ⅌ lb 11c net
Iron, Steel points ... ⅌ lb 5c

Crucibles.—Gautier & Co. ... dis 25&10 %

Curling Irons, &c.
¾, ⅞, 1 in. $1·80, $2·00, $2·40
Curling Tongs ... ⅌ doz $6 50—dis 15 %
Fluting Irons ... ⅌ doz $8 50—dis 15 %

Curry Combs.
Hotchkiss' & Kellogg's, Iron & Brass, old list ... dis 25 %
Fitch's ... dis 20&10 %
Rubber ... ⅌ doz $9·00—dis 15 %
Wood Tools (Fuller Bros.) ... dis 20 %

Curtain Pins.—Silvered Glass, old list dis 33⅓ @ 35 %

Cutlery.
American Table | Meriden | New list Jan. '75, dis 25 %
American Pocket (Cutlery Co.) ... dis 40 %
Am. Pocket—Humason & Beckley Co. ... dis 25 %
Am. Miller Bros.'s Cutlery Co. ... dis 25 %
Naugatuck Cutlery Co. ... dis 25 %

Dippers.
Britannia ... per doz 7·50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain ... per doz—dis 20 %
" Rimmed ... per doz—dis 20 %

Door Collars.
Embossed Gilt ... dis 20 %
Leather ... dis 20 %
Brass ... dis 20 %

Door Springs.
Gem (Y. W. & W.) ... No. 1 Large, Jap'd ⅌ doz $3·50
" " No. 2 Medium ... ⅌ doz 3·00
" Hart Mfg. Co. ... ⅌ doz
Torrey's Pattern (Y. W. & W.) ... ⅌ doz $2·50 net
Gray's (Y. W. & W.) ... ⅌ doz net
Torrey's Patent ... ⅌ doz net
Johnson's ... ⅌ doz net
Philadelphia ... 5 in. ⅌ doz
Palmer's Japanned No. 6 ... ⅌ doz
" Coppered
" Silvered
Challenge—Japanned ... No. 9, per doz $4·00
No. 7 ... 5·00
No. 6 ... 6·00
Barker's Concealed ... dis 12½ %

Drawing Knives.
Crossman's No. 1 ... dis 40&5 %
Douglass, Extra ... dis 50&15&10 %
Hart Mfg. Co., No. 1 ... dis 40 %
Nobles Mfg. Co. ... dis 40 %
Merrill ... dis 40 %
Wilcox ... dis 40 %
Adjustable Handle ... dis 25 %

Drills and Drill Stocks.
Blacksmiths' ... each $2 60 net
" Self-Feeding ... each $3 00 net
Breast, P. S. & W. ... dis 25 %
" Millers' Falls ... dis 25 %
" Aiken's ... dis 25 %
" Nicholson ... dis 25 %
" Wilson's ... dis 25 %
Ratchet, Merrill's ... dis 20 %
" Ingersoll's ... dis 25 %
" Whitney's ... dis 25 %
" Parker's ... dis 25 %
" Moore's Triple Action ... dis 20 %
" Bemis' ... dis 20 %
Wilson's Drill Stocks ... dis 33⅓ %
Automatic Boring Tools ... each $2·75—dis 20 %

Drill Chucks.—The Danbury ... each—dis 15 %
Beach Patent (Morse)

Egg Beaters.
Monroe's ... 9 in. 10 in.
Dover ... Per doz $8·00 9·00 ... dis 10 %
National ... ⅌ doz $1·50—dis 10 %
Peerless ... ⅌ doz—dis 15 %

Emery.
Genuine Chester—Regular Nos ... ⅌ lb 6c
" " Flour and FF ... ⅌ lb 5c
Washington Mills—Regular Nos ... ⅌ lb 6c
" Flour ... ⅌ lb 5c

Enameled and Tinned Ware.
Kettles ... dis 30 @ 40 %
Sauce Pans ... dis 25 %
Glue Kettles ... dis 30 @ 40 %
Tinned Saucepans ... dis 25 %

Escutcheons.
Door Lock ... Same discounts as Door Locks
Brass Thread ... dis 60&10 %
Wood ... dis 25 %

Faucets.
Fenn's ... dis 50 %
Arcade ... dis 40 %
" Cork Stops ... dis 55&10 %
Star ... dis 15&10 %
Frary's Patent Petroleum ... dis 20&10 %
Taylor's Pattern ... dis 40 %
Wood and Metallic ... dis 60&10 %
Wood, Cork Lined ... dis 20 %
Enterprise Mfg. Co., Self-Measuring ... dis 25 %

Felloe Plates ... ⅌ lb 15c; dis 25 %

Files.
American File Co. ... $5 00 to £ currency—dis 15 @ 20 %
Arcade File Works ... $5 00 to £ currency
Auburn File Works ... $5 00 to £ currency
Nicholson ... new list, Jan. 1, 1875, net @ 5 %
Hartford File Co. ... $5 50 to £ currency—dis 10 %
L. B. Heller & Co. ... $5 00 to £ currency
Heller & Bros ... $5 00 to £ currency
"Western" ... 5 00 to £ net
Wheeler, Clemson & Co. ... $5 00 to £ currency
Rothery's ... 5 00 to £ currency
J. & Riley Carr ... 5 75 to £ gold
" Horse Rasps ... 5 50 to £ gold
Stubs' ... 8 50 @ 9 00 to £ gold
Butcher's ... 5 25 to £ gold
Walter Spencer & Co.'s "Diamond" ... 5 00 to £ gold
Spear & Jackson's ... 5 00 to £ gold
Jowitt's ... 5 00 to £ gold
Newbould's ... 5 25 to £ gold
W. & C. Peace's "Imperial" ... 5 25 to £ gold
R. Ibbotson ... 5 00 to £ gold
Turton Bros. & Matthews ... $5 50 to £ currency
Fisher & ... 5 00 to £ gold
Goodlad's ... 4 00 to £ gold
Moss & Gamble ... 5 25 @ 5 75 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) ... 5 00 to £ gold
" Horse Rasps ... 5 00 to £ gold
"Philo Sheffield," P. T. Co. ... 5 00 to £ gold
Limet & Co. (French) ... 5 00 to £ gold

Fluting Machines.
Mrs. Coles' Pony, 4 in., $4·75; 5 in., $5; 6 in., 5·50; 7 in., $6
Knox, with 4-inch Rolls ... 3 50 each net
" " 5 " ... 4 00 each net
" " 6 " ... 5 75 each net
O. K. ... 6 50 each net
Peerless, 4-inch Rolls ... 4 00 each net
" 5 " ... 4 75 each net
Excelsior, No. 1 ... 4 00 each net
" No. 2 ... 5 50 each net
Diamond ... 7 50 each net
Champion, 6 inch rolls ... 7 50 each net
" 4 inch rolls ... 5 50 each net
Climax 7-inch Rolls ... 6 50 each net
" 4½ ... 5 50 each net
Empire ... 4 00 each net
Eureka, No. 1, 7-inch Roll ... 6 50 each net
" No. 2, 5-inch Roll ... 4 00 each net
K. F. M., 4½-inch Roll ... 3 50 each dis 15 %
" 6-inch Roll ... 5 00 each dis 15 %
Myers' Fashion Fluter, 4½-inch Rolls ... 3 75 each net
" Crescent Brass Fluter, Sad Iron attachment ... per doz $15·00
Domestic Fluter ... $1·50 each net
Geneva Hand Fluter ... $15 00 per doz net

Fluting Scissors ... dis 25&10 %

Forges.
"Empire" (W. P. Kellogg & Co.) ... dis 25 %

Forks.
Hay, Manure & Spading ... dis 33⅓ %
Plated A 1 ... dis 20 %

Fry Pans.
Burnished, P. S. & W., new list ... dis 15 %
⅌ doz ... $3·00 3·75 4·25 4·75 5·25 6·00 7·00 8·00 9·00
Smith, Burns & Co., "Excelsior" Polished ... dis 25 %
⅌ doz ... $3·70 4·00 4·70 5·30 6·00 7·00 8·00 9·00

Gas Stoves.
Tift & Howard ... dis 20 %

Gauges.
Marking ... dis 45&10 %
Wire ... dis 10 %
" Smith's Patent ... per doz $18·00, dis 40 %

Gimlets.
Nail and Spike ... dis 25&10 %
Double Cut, Shepardson's ... dis 20 %
" Hartwell's ... dis 40 %
" Ives' ... dis 25 %
" Douglass' ... dis 20&10 %

Grind Stone Fixtures.
Sargent's Patent ... dis 65&10 %
Reading Hardware Co. ... dis 65&10 %
J. F. Green & Bro. ... dis 30 %
Hart Mfg. Co. ... dis 65&5&10 %
Rice Bros. ... dis 45&5 %

Hammers.
Emmet Hammer Co.'s Handled ... dis 25 %
" Sledge & Stone ⅌ lb 10c; dis 40 %
Humason & Beckley Mfg. Co. ... dis 25 %
Maydole's ... dis 25 %
Dunsey's ... net @ dis 5 %
Verree ... dis 5 %
Yerks & Plumb ... dis 20 %
Magnetic Tack ... dis 25&10 %
Warner & Noble's ... dis 10 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair ... dis 25 %
" Leg Irons $6 50 per pair ...
Providence Tool Co.'s Hand Cuffs $15 per doz ... dis 10 %
" " Leg Irons 25 "

Handles.
Door or Thumb Latches—
Nos. 0 1 2 3 4
Per doz $0·80 1·00 1·18 1·35 1·50—dis 60 %
Roggin's Latches ... 40c. @ 50c. net
Bronzed Iron Drop Latches ... per doz $1·20 net
Wrought Chest ... dis 60&10 %
Surface Chest ... dis 65&10&10 %
Flush Chest ... dis 60&10&10 %
Lifting ... dis 60&10 %
Coffin ... dis 50&10 @ 60&10 %
Saw and Plane ... dis 25&10 %
Hammer and Hatchet ... dis 10 %
N. Carolina Handle Co. ... dis 15 %
Brad Awl ... per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td ... 5 25—dis 20&10 %
" " large ... 6 50—dis 20&10 %
Apple " " ass'td ... 6 00—dis 20&10 %
" " " large ... 7 50—dis 20&10 %
Socket " " ass'td ... 3 50—dis 20&10 %
" Framing " ... 7 00—dis 20&10 %
File ... 4 00—dis 20&10 %
Auger ... 6 50—dis 20&10 %
" large ... 8 00—dis 20&10 %
Patent Auger, Ives' ... dis 25&10 %
" " Douglass' ... per set $1 25—dis 10 %
" " Swan's ... per set $1 00—dis 20&10 %

Hangers.
Barn Door ... dis 65&10 %
"Anti-Friction" ... dis 40 %
Novelty ... dis 30 %
Challenge ... dis 40 %

Harness Snaps.
Henshaw's ... dis 25&10 %
Judd's ... dis 40 %
Fitch's (Bristol) ... dis 30 %
Hotchkiss' ... dis 10 %
Andrews' ... dis 25 %
Sargent's ... dis 50&10 %
New York Wire ... dis 20&20 %

Hatchets.—Isaiah Blood ... dis 15 %
Shingling, Nos. 1 2 3 ... ⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3 ... ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ... ⅌ doz 7 50 8 00 8 50
Hunt's ... dis 10 %
Shingling, Nos. 1 2 3 ... ⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3 ... ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ... ⅌ doz 7 50 8 25 9 00
Hurd's ... dis 25 %
Shingling, Nos. 1 2 3 ... ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ⅌ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s ... dis 25 %
Shingling, Nos. 1 2 3 ... ⅌ doz $6 50 7 00 7 50
Claw, " 1 2 3 ... ⅌ doz 7 25 7 75 8 25
Lathing, " 1 2 3 ... ⅌ doz 6 50 7 00 7 50
Yerkes & Plumb ... dis 20 %
Shingling, Nos. 1 2 3 ... ⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3 ... ⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ... ⅌ doz 7 00 7 50 8 00
Simmons's ... dis 15 %
Shingling, Nos. 0 1 2 3 ... ⅌ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3 ... ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ⅌ doz 8 00 8 50 9 00
Broad, " 1 2 3 ... ⅌ doz 9 00 10 00 12 00
" " 4 5 6 ... ⅌ doz 14 00 16 00 18 00
" " 7 8 ... ⅌ doz 20 00 22 00
Elephant ... dis 20 %
Shingling, Nos. 1 2 3 ... ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ⅌ doz 8 00 8 50 9 00
J. P. Verree & Co. ... dis 5 %
Shingling, Nos. 1 2 3 ... ⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3 ... ⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ... ⅌ doz 7 00 7 50 8 00
Underhill's ... dis 10 %
Shingling, Nos. 1 2 3 ... ⅌ doz 7 25 8 00 8 75
Claw, " 1 2 3 ... ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ... ⅌ doz 12 00 11 00 18 00
M. H. Jones & Co. ... dis 25 %
Shingling, Nos. 1 2 3 ... ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ⅌ doz 8 00 8 50 9 00

Hay Knives.—"Lightning" ... per doz $12·00 net

Hinges.
Gate, Western ... ⅌ doz $6·25—dis 60&10 %
" N. E. ... ⅌ doz 11·25—dis 6&10&10 %
" N. Y. State ... ⅌ doz 7·20—dis 60&10 %
Rolled Plate ... dis 65&10 %
" Raised ... dis 65&10 %
Wrought Strap and T ... dis 33⅓&10&5 %
Providence Plate. { 6 and 8 in. 11c ⅌ lb; over 8 in. 9½c ⅌ lb } ... dis 30 %
Screw Hook and Strap ... { 8, 10, 12 in. 6¼c; 14 to 36 in. 5¾c } ... net
Heavy Welded Hook ... { 8 to 12 in., 6¾c; 14 in. & up, 6c } ... net
Screw Hook and Eye ... { ⅝ to 1 in., 8¼c; ½ in. 9¼c; ⅜ in. 11½c } ... net

Hoes.
Solid Shank, C. S. ... ⅌ doz $8 00—dis 35 %
Socket ... ⅌ doz 9 00—dis 35 %
Riveted Eye ... ⅌ doz 5 00—dis 35 %
Grub ... dis 25 %
Planters ... net @ dis 5 %
" Scovill ... add 33⅓ %
" Scovill Pattern ... net @ dis 5 %
Lane's C. E. Cresent, American Pattern ... list net
" " Scovill Pattern ... add 10 %

Hooks.
Bird Cage ... dis 60&10 @ 70&10 %
Cotton ... dis 50 %

Belt ... dis 55 @ 60 %
Bench—Hotchkiss' $5 00 ⅌ doz ... dis 10 %
" Weston's No. 1, $8·00; No. 2, $7·00 per doz net
" McGill's ... $8 00 per doz, dis 10 %
" Skinner's ... per doz $6·25, dis 20 %
Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling ... Hart's list ... dis 60&10&10 %
Sargent's list ... dis 60&5&10 %
Reading list ... dis 35&10 %
Wrought Staples and Hooks and Staples ... dis 70&10 %
Wire Screw Hooks and Eyes ... dis 65&10&10 %
Grass ... dis 20 %
Whiffletree—Patent ... dis 35 %
Hooks and Eyes—Malleable Iron ... dis 60&10&10 %
" " Brass ... dis 60&10&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
American Pressed	⅌ lb	22c	20c	20c	20c	20c	20c
Ausable	"	30c	27c	25c	24c	23c	22c
" P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
" " & Blued	"	32c	29c	27c	26c	25c	24c
Cortland	"	29c	26c	24c	23c	22c	21c
Buffalo Forged	"	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin	"	29c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin	"	30c	27c	25c	24c	23c	22c
Perkins' Pointed and Polished	"	30c	27c	25c	24c	23c	21c
Perkins' Pointed and Blued	"	31c	28c	26c	25c	24c	22c
Putnam	"	32c	28c	26c	25c	24c	23c
Vulcan, P't'd & Blued	"	33c	30c	28c	27c	26c	25c

Star Brand, 16c.; Morgan ... 14c
Putnam ... 2000 lbs., dis 5 %
Ausable, Am. Pressed, Perkins, Globe, National and New London ... 1000 lbs., dis 5 %
Vulcan ... 1000 lbs., dis 7½ %
Vulcan and Brundage ... 500 lbs., dis 5 %

Horse Shoes.
Burden ... ⅌ keg, $5·12½
R. I. Horse Shoe Co., Perkins Pattern ... ⅌ keg, 5·12½
" " R. I. Pattern ... ⅌ keg, 5·87½
Mule Shoes ... ⅌ keg, 6·12½
Perkins' Snow ... ⅌ keg, 6·62½
Boston Rolling Mills Hand Made ... ⅌ lb 8c

Kettles.
Brass ... ⅌ lb 45c net
Enameled ... dis 30 @ 40 %

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe " ... dis 15 %
" Bread " ... ⅌ doz $1·50—dis 15 %
Hay and Straw, "Wadsworth's" ... dis 20 %
Table and Pocket ... See Cutlery

Knobs.
Carriage (Jap'd 80 cents per gross) ... dis 60&10 %
Base—Common ... net
" Plush Tip ... dis 10 %
" Elastic End, No. 8 ... dis 40&10 %
Door, Mineral ... ⅌ doz $2·25 } ... dis 40&5 %
" Por. Jap'd ... ⅌ doz 3·00
" " Plated ... ⅌ doz 7·00 } & 2 % for cash
" " Por ... ⅌ doz 7·50
Furniture, Plain ... 75c gross inch, dis 10 %

Ladles.
Melting, Hart's ... dis 55&10 %
" Sargent's ... dis 5&10 %
" Reading ... dis 15&10 %

Lanterns.
Tubular ... No. 0, $11·00; No. 1, $14·00 net
Peerless ... No. 5, per doz $11·75—dis 10&10 %
Brady's Patent ... dis 10 & 10 %
Ætna ... dis 10 & 10 %
Yankee ... dis 10 & 10 %
De Beque ... dis 10 & 10 %

Lard Presses.
Draw Cut, 14 inch ... each $65 00—dis 20 %

Lemon Squeezers.
Porcelain Lined ... per doz $7 00, dis 15 %
Eureka, Tinned ... per doz, $10·00 dis 10 %
Dunlap's Improved ... per doz $6·00 net

Lines.
Linen Fish ... dis 20 %
Cotton Chalk ... dis 40 @ 45 %
Sil. Lake Chalk ... Nos. 0, 1, 2, 3, $6, 6·50, 7, 7·50, dis 20 %
Mason's ... dis 20 %

Locks and Latches.
Cabinet—Gaylord ... dis 25 %
" Eagle ... dis 22 %
Trunk ... dis 25 %
Langstroth & Crane, Round Key ... dis 40 %
" " Flat Key ... dis 33⅓ %
Barnes & Deitz ... dis 25 %
Continental ... dis 25 %
Shepardson's ... dis 20 %
American Lock Co. ... dis 33⅓ %
Plate ... new list dis 40&2 %
Yale Lock Co. ... dis 40 %
Sargent & Greenleaf ... dis 20 %
Trenton, Branford, Norwich, Russell & Erwin, Norwalk, Nashua, Mallory, Wheeler & Co., P. & F. Corbin, Parker & Whipple, Jacobus & Nimick Mfg. Co. ... dis 40&5 % ... and 2 % for cash
Padlocks, Russell & Erwin, Mallory, Wheeler & Co., Wm. Wilcox & Co. ... dis 40&5 % ... and 2 % for cash
" Romer's ... dis 15 %
" Vulcan Hardware Co. ... dis 20 %
" New York Lock Co. ... dis 20 %
" J. H. McWilliams ... dis 5 %
" Scandinavian Jail ... dis 10 @ 15 %
" Barnes & Deitz ... dis 25 %
" D. K. Miller Lock Co. ... dis 30 %
" Penn Lock Works ... dis 20 %

Mallets.—Hickory and Lignumvitæ ... dis 20 %

Meat Cutters.
Dixon's (P. S. & W.) ... Nos. 1 2 3 4
⅌ doz. $14 00 $17 00 $19 00 $30 00 dis 20 %
Miles Challenge ... Nos 1 2 3
⅌ doz. $22·00 $30·00 $40 00—dis 20 %
Perry's (P. S. & W.) ... Nos. 200 300 400
⅌ doz. $22·00 $27·00 $40·00—dis 10 %
Woodruff's (P. S. & W.) ... Nos. 100 150
⅌ doz. $15·00 $18·00—dis 20 %
Hales' ... Nos. 11 12 13
⅌ doz. $27·00 $33·00 $42·00—dis 35&2 %
Draw Cut ... Nos. 5 6 7
Each $56·00 $90·00 $250 00—dis 20 %
American ... dis 25 @ 25&5 %
No. 1 2 2½ 3 4 B 5
Each ... $6·00 $9·00 $12·00 $15·00 $30·00 $60·00 $75·00

Molasses Gates.
Stebbins' ... dis 62½&10 %
" Tinned ends ... dis 40&10 %
Bush's ... dis 20 %
Lincoln's ... dis 50&10 %
Weed's ... dis 15 %

Mortars and Pestles.
Iron ... net

Nail Pullers.
Taft's ... per doz $24·00 net

Nails ... 10d., $3·10 @ $3·25 net

Nuts and Washers.
Nuts ... large, 6c; small, 8c off list.
Washers ... large, 8½c; small, 10½c off list.

Oilers.
Miller's Zinc, Brass and Copper ... dis 40 %
Sheet Metal Screw, Zinc, Brass and Copper ... dis 40 %
Olmsted's ... dis 25&10 %
Broughton's ... dis 25&10 %
Malleable ... per doz $5 00 dis 10 %
Prior's Patent or "Paragon" ... dis 40 %

Ox Shoes.
Concave ... ⅌ lb 18c net

Ox Balls ... dis 60&10 %

Pencils
Faber's Carpenters' ... net
" Round Gilt ... ⅌ gross $6 00 net
Dixon's Lead ... ⅌ gross $4·50 net
" Lumber ... ⅌ gross 9·00 net

Picture Nails and Knobs.
Brass Head ... dis 60&10 %
Porcelain Head ... dis 55&10 %
Richards' Patent ... dis 40 @ 40&10 %
Judd's ... dis 60&10 %

Pinking Irons ... per doz $2 75—dis 65 %

Planes and Plane Irons.
First Quality ... dis 35 %
Second Quality ... dis 50 %
Bailey's Patent Adjustable ... dis 25&10 %
Plane Irons, Butcher's ... $5 50 to £ gold—new list
" Buck Bros ... $5 50 to £ gold
" Bailey's Patent ... dis 25&10 %
" Auburn Tool Co.'s ... dis 25 %
" Greenfield Tool Co. ... net list
" Middletown Tool Co. ... net list
" Ohio Tool Co. ... dis 10 %
" Spear & Jackson's ... 5 50 to £ gold—new list
" Sandusky Tool Co ... dis 10 %
Plow Bits, Greenfield Tool Co ... dis 10 %

Pliers and Nippers.
Button's Patent ... dis 33⅓ %
Hull's Patent Nippers ... dis 25 %
Leach's Patent Wire Cutters ... per doz $6 50—dis 15 %
Gas Pliers ... dis 25 %

Plumbs and Levels.
Stanley R. & L. Co.'s Pat. Adjustable ... dis 65&10 %
" " Non-Adjustable ... dis 65&10 %
Chapin's ... dis 66⅔&10 %
Standard Rule Co.'s New Adjustable ... dis 60&10 %
Standard Rule Co.'s Non-Adjustable ... dis 60&10&10 %
Pocket Levels ... dis 50&10 %
Johnson's Patent Adjustable ... dis 60&10 %

Pulleys.
Hot House and Tackle ... dis 60&10 %
Jap'd Screw ... dis 60&10 %
Brass Screw ... dis 60&10 %
Jap'd Side ... dis 60&10 %
" Clothes Line ... dis 60&10 %
Hay Fork ... per doz $4 50 @ 5 00, dis 10 %

Pumps.
Douglas Cistern, etc ... new list dis 25 %
" S. & F. ... new list dis 20 %
Union Mfg. Co.'s Cistern and Pitcher ... dis 15 %
" " " Rams ... dis 20 %
" " " Garden Engines ... dis 10 %

Cucumber (Burlingham & Puroy)—
ft. No. 3, with 12 ft. pipe ... $4·00 net
6 ft. No. 1, with 12 ft. pipe ... 4·50 net
From 6 to 36 ft. add 20 cents per ft.
Pipe, 8c. per ft.; Coupling, 20c. per ft.

Punches.
Belt or Drive ... per doz $1·50 net
Spring ... per doz $6·50—dis 20&10 %

Rail.
Sliding Door, Wrought Brass ... ⅌ lb 44c., dis 10 %
" " Iron, Painted ... ⅌ foot 9c—dis 55&10 %
Barn Door, ⅜, ⅝ and ¾ inch ... dis 60&10 %
" " for N. E. Hangers ... dis 60&10&10 %

Rakes.
Cast Steel ... dis 35 %
$8 00 9 00 10 00 11 00
8 10 12 14 teeth.
Malleable ... dis 35 %
$5 00 5 50 6 00 6 50
9 11 13 15 teeth.

Razor Straps.
Evan's ... dis 25&10 %
Genuine Emerson (B. F. Badger or C. Emerson) ... dis 25 %
Imitation Emerson ... ⅌ doz $2·75—dis 40 %
Hunt's ... dis 40 %
Chapman ... dis 10 @ 15 %
Torrey's ... dis 10&10 %
Saunder's ... net @ 10 %

Rivets.—Old Colony.
Iron and Tinned ... dis 25&7½ %
In bulk ... dis 7½ %
Copper Rivets and Burrs ... dis 20 %
Nos. 7 8 9 10 11 12 13 14 15
Per lb. 49c 50c 52c 54c 56c 58c 60c 65c 70c

Rivet Sets ... net

Rods.
Stair ... dis 40 %
" American Patent ... dis 33⅓ %

Rollers.
Barn Door ... revised list dis 60, 10&10 %
Novelty ... dis 10 %

Rope. Manufacturers' List of May 10, 1875.
Manila ... ½ inch and larger ⅌ lb 14½c
" ... ⅜ inch ⅌ lb 15 c
" ... ¼ and 5-16 inch ⅌ lb 15½c
Manila Lath Yarn and Tar'd Rope ... ⅌ lb 14 c
" Hay Rope ... ⅌ lb 15 c
Sisal ... ½ inch and larger ⅌ lb 11½c
" ... ⅜ inch ⅌ lb 12 c
Sisal ... ¼ and 5-16 inch ⅌ lb 12½c
" Hay Rope ... ⅌ lb 12 c

Rules.
	Boxwood.	Ivory.
Chapin's	dis 66⅔&10 %	dis 50&10 %
Stanley	dis 70 %	dis 55 %
Standard	dis 70 %	dis 50&10 %
Stephens'	dis 70&10 %	dis 55&10 %

Sad Irons.
From 4 to 10 lbs ... ⅌ lb 3¾ @ 4c net
Sad Iron, Nickel Stand attached ... ⅌ lb 9c
Self-Heating ... per doz $10 00 net
" Tailors' ... per doz 22 50 net

Sand Paper.
Beader & Adamson's Flint, 00 to 1½ ... $4 25 ⅌ ream
" " " 2, 2½ & 3. 4 75 " ... dis 15 %
" " Assorted. 4 25 "
" " Star ... ⅌ ream $8 25
" " Emery ... ⅌ ream $6 50 @ 11 50
New England, same list as B. & A. Flint ... dis 15 %
H. B. & M. Roman Flint " " " ... dis 15 %

Sash Cord.
Common ... ⅌ lb 18 @ 20c. net
Patent ... ⅌ lb 24c. net
Silver Lake, Russia Flax ... ⅌ lb 55c
" " White Cotton ... ⅌ lb 55c } net
" " Drab Cotton ... ⅌ lb 60c
Raw Hide ... dis 15 %

Sash Locks.
Clark's, Nos. 1 and 2, $10·00 per gross ... dis 33⅓ %
Ferguson's ... dis 33⅓ %
Norwich ... dis 25 %
Walker's ... dis 10 %
New England ... dis 20 %

Sash Weights.—Solid Eyes ... ⅌ lb 2c

Sausage Stuffers or Fillers.
Miles ... ⅌ doz $20—dis 30 %
Stow or Perry ... ⅌ doz No. 1, $15; No. 0, $21—dis 20 %
Draw Cut No. 4 ... each $30 00—dis 20 %

Saw Frames ... per gross $18 00—dis 15&10 %

Saw Rods ... $10 list, dis 10&10 %

Saws.
Spear & Jackson's old pattern ... $4 50 to £ gold
Spear & Jackson's American Pattern ... $3·55 to £ gold
John Spear ... $3 60 to £ gold
Am. Saw Co. ... new list
Perforated Cross Cuts, all kinds ... 68c ⅌ foot
Inserted Teeth ... dis 10 %
All else ... dis 12½ %
Disston's Circular ... dis 20 %
" Mill ... dis 25 %
" Cross Cut ... dis 15 %
" other kinds ... dis 12½ %
H. W. Peace's Circulars ... dis 25 %
" Other kinds ... dis 20 %
Wm. McNiece's Hand, Cross Cut and Circular ... new list dis 15 %
Wm. McNeice's Patent Pole Pruning Saw ... dis 10 %
" " Compass Saw ... net.
E. M. Boynton's Lightning ... dis 40 %
" " Others ... dis 15 %
Wheeler & Clemson Mfg. Co.'s Hand ... dis 15 %
" " " Cross-Cut ... dis 30 %
Livingston's Butcher and Kitchen ... dis 15 %
" Framed Wood—
Nos. 101 102 103 105 106
Per doz $12·00 10·00 12·00 9·00 7·00—net

Saw Sets.
Stillman's Genuine ... ⅌ doz $5·00—dis 10 %
" Imitation ... ⅌ doz 3·25—dis 20 %
Common Lever ... per doz $2·00 dis 20 %
Leach's ... No. 0, $8·00; No. 1, $15·00 dis 15 %
Nash's ... No. 1, $8·50; No. 2, $5·50 dis 20&10 %
Hammer, Hotchkiss ... $5·50 dis 10 %
" Bemis & Call's ... dis 20 %
" Aiken's Genuine ... $15·00 dis 25&10 %
" " Imitation ... $7·00 dis 25&10 %

Scales.
Hatch, Counter ... ⅌ doz $36—dis 25 @ 30 %
" Tea ... ⅌ doz $15—dis 25 %
Union Platform ... $6·00, $7·50—dis 40 %
Turnbull's ... dis 20 %
Brown's ... dis 25&5 %
Fairbanks' ... new list dis 15 @ 20 %
Howe's ... dis 15&5 %
Chatillon's Grocers' ... dis 25 %
" Eureka ... dis 20 %
Universal Family ... dis 25 %
Scale Beams.
No. 1 300 to 1200 lbs ... 90c ⅌ cwt } dis 30&10 %
No. 2 " ... 75c ⅌ cwt

Scrapers.
Box, 1 Handle ... per doz $5·00, dis 10 %
" 2 " ... per doz 6·00, dis 10 %
Foot ... dis 60 & 10 %
Ship (common) ... per doz $3 00 net
Ship—Providence Tool Co. ... dis 10 %

Screw Drivers.
Hart, Bliven & Mead ... dis 55&10 %
Douglass Mfg. Co. ... dis 25&10 %
" " No. 1 ... dis 20&10 %
Disston's ... dis 40&10 %

Screws.
Flat Head Iron, List of September 1, 1875 ... dis 30 %
Round Head Iron " " " ... dis 20 %
Flat Head Brass " " " ... dis 30 %
Round Head Brass " " " ... dis 20 %
Round Head Silver Capped, List March 1 ... dis 25 %
Hand Rail ... dis 35&10 %
Coach or Lag ... dis 30&10 @ 40 %
Coach, Patent Gimlet Point, List Jan. 1, 1875 ... dis 35 %
Bed ... list net
Japanned, List of Sept. 1, 1875 ... Net
Machine—Flat Head, Iron, List Jan. 12, 1875 ... dis 25 %
" " " Brass " " ... dis 15 %
" Round Head, Iron, " " ... dis 20 %
" " " Brass " " ... dis 10 %
English, Flat Head, Iron; American List, Sept. 1, 1875
Nettlefold & Chamberlain's ... dis 30&5 %
Birmingham Sc'w Co. ... dis 30&5 %
Birmingham Screw Co., Brass ... dis 30&10 %
Bench—Iron ... dis 60, 10&10 %
" —Wood, Beach ... ⅌ doz $3·00 net
" " Hickory ... dis 20&10 %
Hand ... dis 25&10 %
Jack—Bell Bottom ... dis 15 %

Scythes.
Blood's German Steel, Grass ... ⅌ doz $10 00
" Cast " " ... ⅌ doz 11 00
" Silver " " ... ⅌ doz 12 00
" German " Grain ... ⅌ doz 14 00 } dis $1·80 from list
" Cast " " ... ⅌ doz 15 00
" Excelsior and Granger ... ⅌ doz 11 00
" Young America ... 10 50
" Silver Clipper ... 18 00
Scythe Snaths ... dis 20 %

Sieves.—Mann's Patent ... New list net
14 16 18 20 24 30 mesh
Iron ... $3·00 3·00 3·25 3·50 3·75 4·75 ⅌ doz
Plated ... 3·50 3·75 4·00 4·25 4·50 6·00 "
Wood Rims ... 18 mesh, $1·50 per doz, dis 10 %

Shears and Scissors.
Cast Steel ... dis 75 @ 75&10 %
Cast Iron ... New list July 15 ... dis 30 %
Heinisch Sons' Trimmers and Scissors ... dis 65 %
" " Standard quality Shears and Trimmers ... dis 40 %
Seymour's Straight Trimmers ... dis 60&10 %
" Scissors ... dis 50 %
Pruning ... per doz $10 00—dis 35 %
Barnard's Lamp Trimmers ... per doz $3·75

Sheaves.
Sliding Door, M. W. & Co. list ... dis 40&5&2 %
" R. & E. list ... dis 50&5&2 %
" Patent Roller ... dis 25 %
" " Hatfield's ... dis 50 %
" Russell's Anti-Friction ... dis 50 %
Sliding Shutter, R. & E. List ... dis 50&5&2 %

Shovels and Spades.
Ames ... dis 20 %
Birmingham Shovel Co. ... dis 15 %
Rowland's ... dis 25 %
Old Colony ... new list dis 10&5 %
Middleboro' Shovel Co. ... new list dis 20 %
C. E. Jennings ... New list dis 20&10 %
Dunning's Shovels and Scoops ... dis 20&7½ %

Shovels and Tongs.
Iron and Brass Head, R. & E. list ... dis 50&10&2 %
" " Hart's ... dis 55&2&10 %
Polished Steel ... dis 50&10&2 %

Skates.
Barney & Berry's
N. Y. Club ... ₩ pair $2·75
B. & B. Club ... 3·50 } dis 25 %
All Clamp ... 4·25
Rink ... 8·00
Florence Steel ... $1·00 dis 25 %
" Spring ... 2·00 dis 30 %
" All Clamp ... 3·50 dis 30 %
Peck & Snyder's—
No. 1, Blued ... per pair $3·00
No. 2, Nickel Plated ... per pair 6·00
No. 3, " extra ... per pair 8·00
Clipper Club Blued ... per pair 3·50 } ...25 %
" Full Pol'd ... per pair 4·50
" and Nickel Plated ... per pair 6·00
Acme Club Skates—Nos. 3 7 10 12 14
Pair $4·00 5·00 7·00 7·50 8·00 dis 20 %

Slates.
Square Frames, Round Cornered, by case ... dis 65&10 %
Less than a case ... dis 65 %

Spoke Shaves.
Iron ... dis 33⅓&10 %
Wood ... dis 30 %
Bailey's ... dis 20&10 %

Spoons.
Tinned Iron ... dis 10 %
" By the case ... dis 20 %
Basting ... dis 10 %
Britannia ... dis 50&5 @ 55 %
" Boardman's, new list ... dis 55 %
Rogers & Bro., A 1 ... dis 50 %
Derby Silver Co ... 40 & 5 %
Holmes, Booth & Haydens ... dis 50 %
Nickel Silver Co ... dis 40 %
German Silver ... dis 30 @ 35⅓ %
Tin (P. S. & W.)—
Teas ... $1·50 ₩ gross, net
Tables ... 2·75 " net

Stocks and Dies. ... dis 5&10 %

Stone.
Hindostan Stone ... ₩ lb } dis 30&10 %
" Axe Stone ...
" Slips ...
Sand Stone ... ₩ lb 6c—dis 20&10 %
Washita Stone ... No. 1, ₩ lb 30c net
" ... No. 2, ₩ lb 25c net
" Slips ... No. 1, ₩ lb 60c net
Arkansas Stone ... No. 1, ₩ lb $1·25 net
" Slips ... No. 1, ₩ lb $2·00 net
Grindstones, Family, J. F. Green & Bro ... dis 20 %

Stove Polish.
Joseph Dixon's ... ₩ gross, 6 00
Gem ... ₩ gross $4·25 @ 4·50 net
Gold Medal ... ₩ gross $4 00 dis 25 %

Squares.
Steel ... dis 50 %; full cases, dis 50&10 %
Iron ... dis 50 %; full cases, dis 50&10 %
Nickel Plated ... add $2 50 @ $4 00 ₩ doz net
Try Squares and T Bevels ... dis 45&10 %
Star Try Squares and Bevels ... dis 30 %
Disston's Try Squares No. 1 ... dis 30 %
" No. 2 ... dis 30 %
" " Improved ... dis 30 %

Tacks.
Full Weight American Iron ... dis 45&7½ %
Half Weight American Iron ... dis 72½&7½ %
Carpet ... dis 75 %
Brads American Half Weight ... dis 50&7½ %
Finishing Nails ... ¾ ⅞ 1 1¼ in. and over
₩ lb ... 20c 16c 14c 13c dis 7½ %
Trunk and Clout ... ⅜ ½ ⅝ 1¼ in. and over
₩ lb ... 20c 16c 14c 13c dis 7½ %
Copper Tacks ... ₩ lb 50c—dis 7½ %
Iron Shoe Nails, ₩ lb 4-8 and longer, 8½c; 3½-8, 10c ... dis 7½ %
Double Pointed ... dis 7½ %

Tapes, Measuring.
American Flask and Cap Co ... dis 20 %
Eddy's ... dis 20 %

Tea Trays.
American Tea Tray Co ... dis 15 %

Thermometers.
Tin Case ... dis 50&10 %

Toe Calks.
Winsted ... ₩ lb 18c, dis 10&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion) ... dis 20 %
Wood Bottom ... per doz $13—dis 25&10 %
All Iron ... per doz $17·50—dis 25&10 %

Tinners' Tools and Machines.
P. S. & W ... list net

Traps.
Game, Newhouse ... dis 25 %
" Peck, Stow & Wilcox ... dis 30 %
" Hotchkiss ... old list dis 30 %; new list dis 10 %
" Blake's Patent ... dis 30 %
Mouse, Wood Choker ... ₩ doz holes 15 @ 16c
" Patent Choker Union Nut Co ... ₩ doz holes 18 @ 18c net
" Round, Wire ... ₩ doz $1 50 to 2 00 net
" Square, " ... ₩ doz 2 00 to 2 50 net
" Cage, " ... ₩ doz 2 50, dis 10 %

Trowels.
Lothrop's Brick and Plastering ... dis 10 %
Disston's Brick and Plastering ... dis 12½ %
Rose's Brick ... dis 5 %
Brades' Brick ... gold dis 10 %
Worrall's Brick and Plastering ... dis 20 %
Garden ... dis 25 %

Triers.
Butter and Cheese ... dis 25 %

Ventilators (Window).
Nickel and Gilt ... per dozen $16·00 @ 18·00

Vises.
Trenton Vises, Solid Box.
40 to 160 lbs ... 16c
160 and over ... 18c
Peter Wright's ... ₩ lb 15½c, gold
Wilson's Solid Box ... ₩ lb 15 @ 20 %
" 25 to 160 lbs ... 18c
160 and upward ... 22c
Wilson's Parallel ... dis 30 %
Sargent's " ... dis 30&10&10 %
Backus & Union, Parallel ... dis 25 %
Buffalo, Parallel ... new list dis 25 %
Fisher & Norris' Double Screw Parallel ... dis 15&10 %
Trenton Parallel ... dis 15 %
Merrill's Parallel ... dis 15 %
Parker's ... dis 20 %
Stephens' Parallel ... dis 15 @ 20 %
Bonney's Saw Filers ... per doz $20—dis 20 %
Stearn's Saw Filers ... per doz $20—dis 20 %

Wheel Barrows.
Canal (Pugsley & Chapman) ... new list dis 15 %
Coal, Garden and Stone (Pugsley & Chapman) ... dis 25 %

Well Wheels.
Revised list ... dis 60&10 %

Wire.
Brass and Copper ... dis 10 %
Bright and Annealed ... Nos. 0 @ 18 dis 40 @ 45 %
" ... " 19 @ 26 dis 47½ @ 52½ %
" ... " 27 to 36 dis 52½ @ 57½ %
Coppered ... " 0 @ 18 dis 35 @ 40 %
Galvanized, Nos. 0 to 9 ... ₩ lb 9c net
Galvanized, Nos. 10 to 18 ... market list dis 10 @ 15 %
Tinned ... dis 25 @ 30 %
Cast Steel ... dis 20 @ 30 %
Tinned Broom Wire ... dis 30 @ 35 %
Galvanized Telegraph, Nos. 8 and 9 ... ₩ lb 9c @ 9½c
Galvanized Telegraph, Nos. 10 and 11 ... ₩ lb 10c @ 10½c
" " 12 ... ₩ lb 10½c @ 11c
Annealed Fence, Nos. 8 and 9 ... dis 45 %
" Grape, " 10 to 14 ... dis 45 %
Fence Staples ... ₩ lb 3½ @ 3¾c
Stubs' Steel Wire ... $1 00 to 2 gold
Judd's Picture Wire ... dis 50
Clothes Line Wire ... per coil 60c. net

Wrenches.
American Adjustable ... dis 45 %
Baxter's Adjustable "S" ... dis 30 %
" Diagonal ... dis 30 %
Collins & Co.'s ... dis 45 %
Coes' Genuine ... dis 40&5 %
" Pattern (Wrought) ... dis 50&10 %
" (Malleable) ... dis 65&10 %
Lindsay's Patent ... dis 50&10 %
Taft's Pattern ... dis 25 %
Davis' Patent Duplex ... new list dis 25 %
Bemis & Call's Patent Combination ... dis 20&5 %
" " Merrick's Pattern ... dis 25&2½ %
" " Brigg's Patent ... dis 25&10 %
Aiken's Pocket (Bright) ... dis 20&10 %

Wringers.

		Less than 3 doz	3 doz lots
Providence	₩ doz	$72·00	$70·00
Reliance	₩ doz	69·00	67·00
Universal—Extra	₩ doz	72·00	70·00
Novelty	₩ doz	72·00	70·00
Sherman	₩ doz	72·00	70·00
Wringers without Cog Wheel	₩ doz	63·00	60·00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 10 %.

COMMON STAMPED WARE, &C.

Bucket Covers.

Quarts	1	2	3	4
Inch	4½	5 5-16	6 5-16	6⅝ 7 11-16
Per gross	[illegible]	[illegible]	[illegible]	5·75
Quarts	6	8	10	12
Inch	[illegible]	[illegible]	[illegible]	10 9-16
Per gross	6·50	[illegible]	[illegible]	11·50

Cake Box Covers. Small. Medium. Large.
Inch ... 11½ 13½
Per gross ... 15·00 22·00

Pot Covers.
Inch ... [illegible] 10½
Per gross ... [illegible] 8·25
Inch ... [illegible] 10½
Per gross ... [illegible] 16·50

Pie, Dinner or Scolloped Plates.
Inch ... 8 9 10 11
Per gross ... $4·00 4·50 5·50 [illegible]

Deep Pie Plates.
Inch ... 10
Per gross ... 10·50

Jelly Cake Pans.
Inch ... 10
Per gross ... $9·00 10·00

Coffee Pot Covers.
Pints ... 1½ 2 3 4 5 6 qts.
Per gross ... [illegible] 8·00
Rimmed ... [illegible] 4¾ inches.
T. K. Breasts only.
Inch ... [illegible] 10 11½
Per gross ... [illegible] 10·00 12·00 19·00

Grater Plates.
Sheet ... [illegible] 1
Per gross ... $3·00 11·50

Scolloped Cake Pans. Small. Large.
Without Tubes ... per gross $9·00 11·50
With Tubes ... 10·00 14·00

Stamped Square Pans.
No ... ½
Per gross ... $7·50 14·50
Common Square Pans (One Sheet).
Per gross ... $11·50
Milk Skimmers (Plain or Pierced).
Per gross ... $4·00
Lettered Plates
Inch ... 5¼ 6
Per gross ... $3·25 4·00
Steamer Bottoms.
Add $1 per gross, or 10c. per doz. to list of Pot Covers.
Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7
Plain ... per gro.	$4·00	4·50	5·00	5·50	6·00	7·00
Jap'd or Burn'd	6·00	6·50	7·00	8·00	8·50	10·00

Coffee Boiler Lips.
Small. Large.
To Rivet ... per gross, $0·80 1·10
To Solder ... " 1·25

STAMPED DEEP AND RETINNNED WARE,

Discount 20&10 %.

Plain Stamped Water Dippers.
½ pint. Pint. Quart. quarts. 2½ quarts.
Per doz ·90 1·15 1·50 1·85 2·50

Retinned Milk Pans.

Qts	½	1	1½	2	3	4	5	6	8	10	12
₩ doz	1·20	1·50	1·75	2·00	2·25	3·15	3·50	3·95	4·75	5·25	5·75

Dipper Bowls, Plain Stamped—
Pints ... ½ 1 Quarts ... 1 2 2½
Per doz ·50 ·75 Per doz ... 1·00 1·25 1·75
Dipper Bowls Retinned—
Pints ... ½ ¾ 1 Quarts ... 1 2 2½
Per doz ·75 ·95 1·05 Per doz ... 1·40 1·75 2·25

Pans.
Dish Pans, Retinned Deep—
Quarts ... 7 8 10 14 17 21 30
Per doz ... 8·50 9·50 11·00 13·00 16·00 19·00 30·00

JAPANNED TIN WARE, dis 5 %.

Cannisters, Common ... Pound ½ 1 2 3
Per gross $10·50 15·00 24·00 30·00
Canisters, Hinged ... Pound ½ 1 1½ 2 3 4
Per gross $19·00 25·00 32·00 37·00 42·00
Canisters, Square ... Pound 2 4 6 8 13 16
Per doz $3·00 4·25 5·00 5·75 8·00 9·10
Candlesticks, Japanned ... No. 1 2
Per gross $5·00 7·00
Cake Boxes, Round ... per nest, $3·25
" Square ... per nest, 4·25
Chamber Pails, Japanned
Nos ... 2 3 4 5
Green, per doz ... $8·00 9·00 11·00 13·00
Oak " ... $9·00 11·00 12·00 13·50
Dust Pans, Corrugated ... per gross, $22·00
Box Graters ... per gross, $3·75
Molasses Cups ... Pint ½ 1 2 4
Per gross $13·00 16·00 28·00 42·00
Lunch Boxes, per doz ... 7 in. $2·00; 8 in. $2 50
Pepper Boxes Japanned ... ₩ gross small, $3·00; large, $4·00
Toy Banks, House ... No. 1 2
Per gross $7·00 5·50
Toy Banks, Gothic ... No. 1, $6·00, No. 2, 4·00 per gross
Toy Cups, Straight ... No. 1 2 3
Per gross $3·75 3·25 2·75
Toy Cups, Flaring ... No. 1, $4·25; 2, $3·75 ₩ gross
Toy Pails, Covered ... No. 1, per gross $4·00
Toy Rattles ... per gross, $2·00
Trunks, Wire Handled ... per nest (5) $1·75
Spittoons, Tin ... per gross, $27

PLANISHED TIN WARE, dis 30 %

Tea Pot Handles—P. S. & W ... dis 20 %
Stow's Patent Hollow Tea Pot Handles.
No. 1, Small 4½ inches ... per gross, $11·50
No. 2, Medium, 5⅛ " ... " 12·50
No. 3, Large, 6⅛ " ... " 13·50
No. 4, Ex. Large 7⅛ in., for Wash Pitchers &c ... " 18·00
Solid Iron, Tin Tipped.
No. 10, Small, 4½ inches ... per gross, $9·00
No. 15, Medium, 5⅛ " ... " 9·50
No. 20, Large, 6⅛ " ... " 10·75
Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.
No. 12, Bronzed and Tin-Tipped ... per gross, $13·50
Saucepan Handles, Of Best Malleable Iron.
P. S. & W ... dis 20 %
Japanned.
No. 1, 5½ inches long ... per gross, $3·50
No. 2, 6 " ... " 3·75
No. 3, 6½ " ... " 4·00
No. 4, 7½ " ... " 4·25
No. 5, 8 " ... " 4·50
No. 6, 9 " ... " 4·75
Tinned.
No. 1, 5½ inches long ... per gross, $4·25
No. 2, 6 " ... " 4·50
No. 3, 6½ " ... " 4·75
No. 4, 7½ " ... " 5·25
No. 5, 8 " ... " 5·50
No. 6, 9 " ... " 5·75
Japanned ... per lb., ·16
Tinned ... " ·20
Iron Kettle Ears (P., S. & W.) ... dis 45 %
Half gross pairs in a package.
Tinned
Nos ... 1 2 3 4 5 6 7
Per gross pairs ... 88c $1·00 1·50 1·75 2·10 2·75 3·75 [illegible]
Black.
Nos ... 1 2 3 4 5 6 7 8
Per gross pairs ... 75c 88c $1·25 1·50 1·75 2·25 2·75 4·00
Tinned Tea Kettle Ears.
Nos ... 4 5 6
Per gross pairs ... $1·75 3·10 2·75
Extra Heavy Tinned Kettle Ears—French Pattern.
Nos ... 1 2 3 4 5 6 7
Per gross pairs ... $1·00 1·25 1·50 1·75 2·00 2·50 3·00
Malleable Iron Kettle Ears for Coal Hods &c.,
P., S. & W ... dis 20 %
No. 10 Small ... ₩ lb. Tinned 21c; Black, 16c
No. 20 Medium ... ₩ lb, " 21c; " 16c
No. 30 Large ... ₩ lb, " 20c; " 16c
No. 40 Extra Large ... ₩ lb, " 20c; " 16c
In cases of 100 lbs. each.
Milk Can or Boiler Handles—(P. S. & W.) 4½ in. dis 25 %
Plain, 8c.; Jap'd, 9c.; Tinned, 15c. per lb.; Malleable Clips or Ears to match, Tinned ... 20c per lb.
Toilet Ware Handles—4½ inches (P. S. & W.) ... dis 35 %
Plain with drilled holes, per lb ... 9c
Plain with Cast " ... 8c
Plumbers' Scrapers—(P. S. & W) ... dis 25 %
Extra quality, length 6 in., per doz ... $4·00

METALS.

IRON.—Duty Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1½ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—American.
Foundry No. 1 ... ₩ ton, $25 00 @
Foundry No. 2 ... " 23 00 @
Gray Forge ... " 20 00 @ 22 00
SCOTCH.
Coltness ... "
Glengarnock ... "
Gartsherrie ... "
Eglinton ... "

Bar Iron.
Am. Refined, at mill ... 2·6c. @ 2·8c

Rails.
American, at works, currency ... " 45 00 @ 50 00
Old Rails ...

Scrap.
Wrought Scrap ... " 30 00 @ 32 50

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square ... } ₩ ton $57 50
to 6 in. x ⅜ to 1 in ... }
Refined Iron.
¾ to 2 in. round and square ... } " 60 00
1 to 6 in. x ⅜ to 1 in ... }
1 to 6 in. x ¼ and 5-16 ... " 65 00
Shafting Iron—2¼ to 4 in ... " 67 50 @ 77 50
Rods—5-16 to ⅝ round and square ... " 62 50
Bands ... " 75 00
Hoops—¾ to 2 in ... " 82 50 @ 132 50
Swedish Iron.
Ordinary sizes ... " 132 50 @ 135 00
Plow size ...

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English.
Nos 10 to 20 ... ₩ lb	4c	5c	5¼c
21 to 24 ... "	4¼c	5¼c	5½c
25 to 26 ... "	4½c	5½c	5¾c
27 ...	4¾c	5¾c	6c
28 ...	5c	6c	6¼c

Galvanized, 14 to 20, prime, ₩ lb 8¼c; 2d quality ₩ lb 7½c
" 21 to 24 " " 9¼c; " " 8¼c
" 25 to 26 " " 10 c; " " 9 c
" 27 " " 10½c; " " 9¾c
" 28 " " 11¼c; " " 10¼c
Patent Polished ... ₩ lb 14c
Russia, Nos. 8 to 16 ... " 15¼c
" Stained, No. 1 ... " 14½c
Belgian ... 10c
One piece Corrugated Sheet Iron Elbows.
CHARCOAL IRON.
¾ 5 5½ 6 7 inch.
$3·50 3·50 4·50 5·25 6·50 per doz.
RUSSIA IRON.
4½ 5 5½ 6 7 inch.
$5·00 7·00 9·50 12·00 14·00 per doz.

COPPER—Duty. Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot ... ₩ lb 23¼ @ 23½c
English " ...
SHEATHING, BRAZIERS' COPPER, BOLTS, &C.
Braziers' Copper, ordinary sizes, over 16 oz., per square foot ... 31c. ₩ lb
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot ... 33c. "
Braziers' Copper, 12 oz. per square foot ... 35c. "
Circles less than 84 inch in diameter ... 34c ₩ lb
Circles, 84 inch diameter and over ... 37c. "
Segment and Pattern Sheets ... 34c. "
Locomotive Fire Box Sheets ... 31c. ₩ lb
Sheathing Copper, over 12 oz. per sq. ft ... 30c. "
" 12 oz. ₩ sq. ft. and lighter ... 35c. "
Bolt Copper ... 31c. "
Copper Bottoms, 38c. ₩ lb ... net
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier ... 37c. By the case, 36c. ₩ lb
12 oz. and lighter ... 40c. " " 39c. "
Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier ... 39c. By the case, 38c ₩ lb
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier ... 41c. ₩ lb
12 oz ... 44c. "
TINNING.
14x48, by the case ... 8c. ₩ sheet
14x48, less than case ... 10c. "
Other sizes not larger than 30x60 ... 2½c. ₩ sq.
Larger than 30x60 ... 3c. "

Brass.
ROLLED AND IN SHEETS.
For the purchase of 100 pounds and over at one time
HIGH BRASS.
All Nos. to No. 8, and widths 14 in. and under ... 30c
All Nos. to No. 8, inclusive, and widths over 14 to 0 in. inclusive ... 33c
Over 0 in. to 30 in. inclusive ... 36c
½c ₩ lb advance on each No. above No. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass at ... 49c
Sheets 4x48 in., and all sheets cut to particular sizes and lengths ... 36c
Printers' Rules ... 40c
Sheets wider than 30 in. and under 40 in ... 40c
" 40 in. and over ... 42c
Circular sheets in diam. from 4 in. to 14 inclusive ... 40c
" " " over 14 in. to 0 " ... 43c
" " " " 0 in. to 30 " ... 46c
" " " " 30 in. to 40 " ... 49c
" " " " 40 in ... 52c
LOW BRASS.
4c ₩ lb more than High Brass.
Gilding Metals, 7c ₩ lb more than High Brass.
Platers' or Gold Metal } In Bars ... 42c
} Sawed ... 45c
FOR SLITTING: Metal in Width.
in. to ½ in., to No. 30, inclusive, 1c ₩ lb advance.
in. to 1 in., thinner than No. 30, c ₩ lb advance.
in. to ¾ in., " " 30, 3c " "
⅛ in. and less to No. 30, c ₩ lb advance.
⅛ in. and less thinner than No. 30, 5c ₩ lb advance.

BRASS AND COPPER WIRE
(Stub's Wire Gauge).

	High Brass.	Low Brass.	Gild'g and Cop'r
Nos. 0 to 20	33	37	43
Nos. 21, 22, 23	34	38	44
Nos. 24 and 25	35	39	45

Brass Rods, No. 8 and larger, 39c ₩ lb, less 10 per cent. Wire straightened and cut, smaller than No. 8, special rates, not less than 6c ₩ lb advance.

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r
No. 6	0·41	0·45	0·51
No. 7	0·44	0·48	0·54
No. 8	0·46	0·50	0·56
No. 9	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·03
No. 36	0·78	0·82	1·15
No. 37	0·98	0·98	1·28
No. 38	1·28	1·28	1·78

Ten cents per pound extra for Spooling.
MISCELLANEOUS.
Common Plain Brass Pail Ears ... 39c net
Hose Pipes, 500 and over ... 79c net
" under 500 ... 84c net
Door Rail ... 44c—dis 10 %
TUBING
(Brown & Sharpe's Gauge.)
₩ lb
Plain to No. 20, inclusive ... $0·48
Nos. 21, 22, 23, 2c. advance on List for each No.
Nos. 24, 25, 26, 4c. " "
Above No. 26 special rates.
Plain Tube, 1-4 inch ... 64
" 3-16 " ... 1 49
" 1-8 " ... 1 74
All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20 ... 57
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet.
Discount on the foregoing list, 10 per cent.

LEAD—Duty: Pig $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2¼ cents per lb.
Spanish ... 7c gold
German Refined ... 6¾c gold
English ... 6¾ @ 7c gold
American ... 6 @ 6¼c gold
Bar ... dis 10 % ... 8¾c.
Pipe ... dis 10 % ... 9¾c.
Tin Lined Pipe ... dis 10 % ... 16½c.
Sheet ... dis 10 % ... 10¼c.
Shot ... dis 10 %. Drop, 9¾c. Buck, 10¾c.
BABBITT METAL.
N. P. U ... ₩ lb 8½ @ 9c
A., 25c.; B, 20c.; C, 15c.; D, 12c. ₩ lb.

SOLDER ... No. 1, 14c.; No. 2, 18c

STEEL.—Duty: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.
Tool ... 15 @ 16c
Spring ... 10c
Homogeneous ... 12½c
Tire ... 12½ @ 13½c
Machinery (round and square) ... 10 @ 11c
File ... 11c
Sheet ... 14 @ 16c
Saw Plate, mill and mulay ... 14 @ 16½c
Saw Plate, gang and X cut ... 13 @ 14c
" circular as to size ... 18 @ 30c

Chrome Steel.
Tool ... ₩ lb 20 @ 21c
Tool, extra fine ... " 40 @ 75c
Spring ... ₩ lb 12c and upward
Machinery ... ₩ lb 14c
Hammer ... " 15c,
Gun or Homogeneous ... " 16c

English Steel.—payable in gold, net.
" Best Cast ... ₩ lb 17½c
" Extra Cast ... " 18½c
" Round Machinery, Cast ... ₩ lb 10¾ @ 11½c
" Swaged, Cast ... " 19½c
" Best Double Shear ... " 17½c
" Blister, 1st quality ... " 14½c
" " 2d quality ... " 13 c
German Steel, Best ... " 11½c
do 2d quality ... " 10½c
3d quality ... " 9½c
Sheet Cast Steel, 1st quality ... " 17½c
" " 2d quality ... " 14½c
" " 3d quality ... " 12½c
File Steel, Flat and ½ Round ... " 12½c
" Square and Round ... " 12½c
" Mill ... " 13½c
Taper to 4 inch ... " 16c
" Taper 3 and 3½ inch ... " 18c

SPELTER—Duty: In Pigs, Bars and Plates, $1 50 per 100 lbs.
Silesian, cash ... 6¾ @ 7c., gold
American " ... 7½ @ 11c., currency

TIN—Duty: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per lb; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Blockand Pigs, free. Banca, subject to dutyof 10 per cent.
Banca ... ₩ lb 24c., gold
Straits ... ₩ lb 20 @ 20½c., gold
English ... ₩ lb 20 @ 20½c., gold
TIN PLATES, CURRENCY PRICES.
I C 10x14, Prime Charcoal ... 9 @ 9·50
12x12, " ... 9·50 @ 10·00
14x20, " ... 9·75 @ 10·25
I X 10x14, " ... 11·25 @ 11·75
12x12, " ... 11·75 @ 12·25
14x20, " ... 12·25 @ 12·75
D C 12½x17 " ... 8·50 @ 9·00
D X 12½x17 " ... 10·75 @ 11·25
For each additional X add ... 2·25
COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$ 8·75 @ 9·00	8·25 @ 8·50	7·50 @ 8·25
I C 12x12	9·25 @ 9·50	8·50 @ 8·75	
I C 14x20	9·25 @ 9·50	8·50 @ 8·75	7·50 @ 8·00

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 8·25 @ 8·50	8·00 @ 8·25	7·50 @ 8·00
I X 14x20	10·25		
I C 20x28	17·75 @ 18·00	16·25 @ 17·00	16·25
I X 20x28	22·00		
I C 20x200	22.50		

ZINC.—Duty: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₩ lb.
Sheet ... cask 10¼c
" ... open 10½c

Old Metals.

(Dealers' Selling Price.)

Copper		@ 20
Yellow metal	14	@ 15
Brass	13	@ 14
Heavy Composition	17	@ 18
Old lead, solid	6	@ 6¼
Tea lead		5
Wrought Iron	1¼	@
Sheet iron	0¾	@ 0⅞
Cast iron		⅞
Machinery iron	1¼	@ 1
Zinc	5	@ 5¼
Pewter, No. 1	17	
" No. 2	10	@ 12
Spelter	5	@

Paints, Oils, etc.

Paints.
Black, lamp—Coach Painters ... ₩ lb 20c
" " Ordinary ... 6c
" Ivory Drop, fair ... 15c
" " best ... 26c
Black Paint, in oil ... kegs, 8c.; ass't'd cans, 11 c
Blue, Prussian, fair to best ... 50 @ 75c
" " " " in oil ... 35 @ 65c
" Chinese, dry ... 83c
" Ultamarine ... 25 @ 80c
Brown, Spanish ... 1½c
" Van Dyke ... 9c
Carmine, 40 ... $12 00
Green, Chrome ... 15 @ 28c
" " in oil ... 18 @ 25c
" Paris ... good, 30c; best, 40c
" " in oil ... " 30c " 45c
Mineral Paints ... 1¼ @ 4c
Orange Mineral ... 14c
Red Lead, American ... 9½c
" " English ... 10½c
" Venetian (N. C.) dry ... 2¾c
" " in oil ... ass't'd cans, 11c; kegs, 8½c
" Indian, dry ... 10c
Rose Pink ... 12c
Sienna American, Raw ... 4c
" Burnt ... 4½c
" " in oil ... 16 @ 26c
" Raw " ... 15 @ 25c
Umber, Burnt ... 4 @ [illegible]c
" " in oil ... 16 @ 21c
" Raw ... 3½ @ 7½c
" " in oil ... 16 @ 22c
Vermillion, Chinese ...
" English ... 1 15 @ 1 18, gold
" Trieste ... 1 10 "
" American, Common ... 28c
White Lead, American, pure dry ... 10c
" " in oil ... 11c
White, Paris, English, prime ... in bbls. 2¼ @ 2¾c
Yellow Ochre, French ... 2¼ @ 2¾c
" " " in oil ... ass't'd cans, 11c; kegs, 8½c
" " Vermont ... in casks 1½c
Yellow Chrome ... 17 @ 27c
" " in oil ... 18 @ 28c
Zinc White, American No. 1 dry ... 9c
" " 1, in oil ... 11c
" French (Paris) ... 11c
" " in oil ... 12c

Oils.
Linseed Raw ... ₩ gal. casks, 60c. bbl., 62c
" Boiled ... " 68c. " 69c
Whale, Crude ... "
" Bleached Winter ... " 75c
Sperm, Crude ... bbl. 1·65
" Winter unbleached ... " 1·90
" " Bleached ... " 2·00
Seal, Extra Refined ... "
Lard, Pure Winter ... " 1·30
" Spring ... " 1·20
Cotton Seed, Crude ... " 60c
" Southern Yellow ... " 65c
" White ... "
Neatsfoot, Winter ... 70c @ $1·10
Natural Lubricating ... 38c @ 40c

Sundries.
Asphaltum ... 9c
Benzine ... ₩ gal. 16c
Chalk ... 1¼ c
" Block ...
Dryer, Patent, Am'n ... ass't cans, 10½c.; kegs, 9c
" " English ... " 11c.; " 9c
Flocks ...
Frostings ... 50c
Glue, White ... 33 @ 47c
" Sheet ... 20c
Glaziers' Points, Zinc ... 9c
Gum, Copal ... 36c
" Damar ... 25c
Shellac, English ... 75c
" " " dark ... 65c
Litharge ... 10c
Pumice Stone, selected Lumps ... 4 @ 6c
" powdered ... 4c
Putty in bladders ... 3½c
" in bulk ... 3c
Rotton Stone, soft, English ... 8c
Spirits Turpentine ... 32c
Whiting, Spanish ... ¾c

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Many improvements attained are noticeable in these Pitchers. Water and ice standing in them do not come in contact with any metal whatever. They are perfectly clean, and easily kept so. They are perfectly free from all odor or rust. Lemonade, beer, milk, etc., may be kept cool in and drank from these pitchers without endangering health. There can be nothing cleaner or purer for holding liquids than pure, white china. There is no possibility of leakage.

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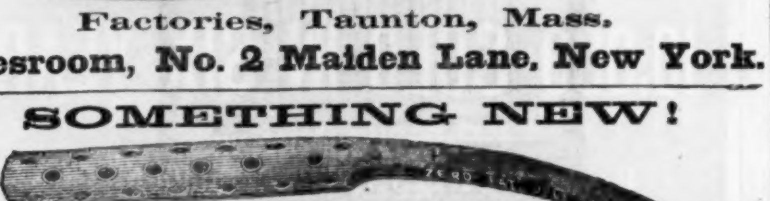

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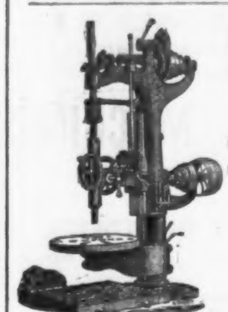

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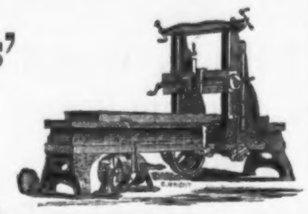

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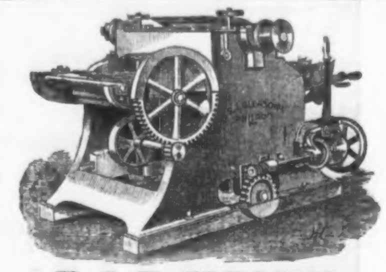

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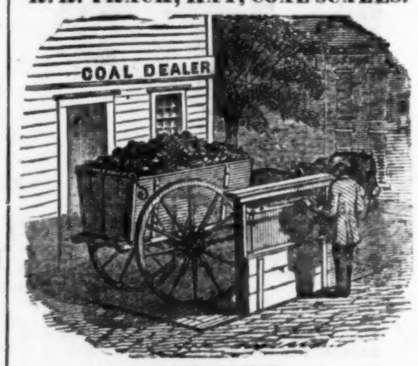

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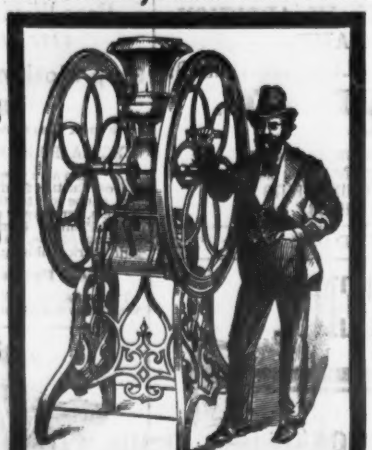

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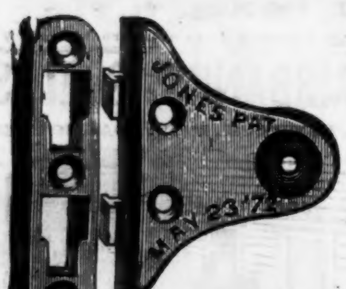

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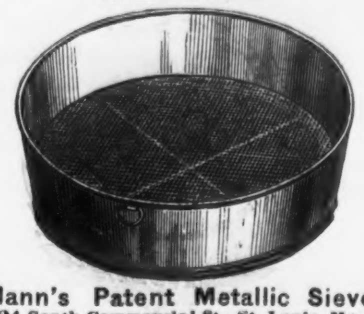
R. J. MANN & CO.,
Sole Manufacturers of



Mann's Patent Metallic Sieve,

24 South Commercial St., St. Louis, Mo.
The best sieve in use. To be had of all dealers.

A full assortment of these goods kept in stock at 88 Chambers Street., N. Y.
GRAHAM & HAINES, Sole Agents

SAMUEL LORING'S

PLYMOUTH TACK AND RIVET WORKS
PLYMOUTH, MASS., manufacturer of
TACKS, BRADS, NAILS AND
RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d, 2d and 6d Fine, Trunk, Clout, and Cigar Box Nails; Black and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points &c., &c., &c., COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, from 1d to 6d, in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets: Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

Grundy & Kenworthy

HARDWARE.
165 Greenwich Street.
Agent for the Philadelphia Star Carriage and Tire Bolts

FLUTING MACHINES.

The Celebrated K. F. M.
Manufactured for the Trade by
HENRY SOMMER,
8 to 12 Pearl Street, NEWARK, N. J.

Established in 1836.

Shelton Company,

Manufacturers of every variety of

TACKS & SMALL NAILS,

Carriage, Machine, Plow, Stove and Tire Bolts, Coach Screws, Bed Screws, &c.
BIRMINGHAM, CONN

Buy the COVERT SNAP

And you will buy no other. It is the most convenient, durable, safe and reliable Snap ever used. It has a brass coil spring that is four times as long as any other coil spring snap, and is enclosed in the barrel back of the bolt, making a snap which works freely under all circumstances, and without danger of having its parts broken or disarranged. We manufacture all sizes of Harness Snaps and Round Eye Snaps, and Covert's Patent Thimble to go on rope for Cattle and Horse Ties. Also other goods.

Send for price list and circulars.

HOLD BACK & SNAP CO., Troy, N.Y.

Established in 1839.

A. G. COES & CO.

WORCESTER,
Mass.,
Manufacturers of
THE GENUINE
COES'
SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'
NEW PATENT
FERRULE

Which cannot be forced back into the handle.

Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be *vigorously prosecuted.*

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

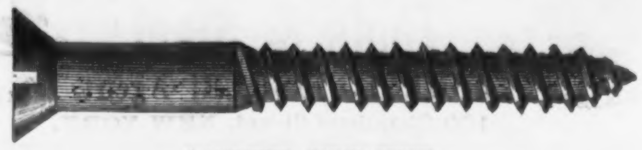
The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS, IMPORTERS AND DEALERS IN

GENERAL HARDWARE.



AGENTS FOR THE

Patent Bessemer Metal Wood Screws,

MANUFACTURED BY

UNION STEEL SCREW CO.,

CLEVELAND, OHIO.

We are prepared to furnish these Screws at manufacturers' prices, either Bright or Annealed, and will warrant them the strongest and most perfect Wood Screws in market.

In making orders, please state whether Annealed or Bright are wanted (we consider the former preferable); also, if it is desirable to have them shipped direct from Cleveland, Ohio. We deliver there or in New York, free of freight.

QUACKENBUSH, TOWNSEND & CO.,

Hardware, Cutlery, &c.

59 & 61 Reade Street, N. Y.

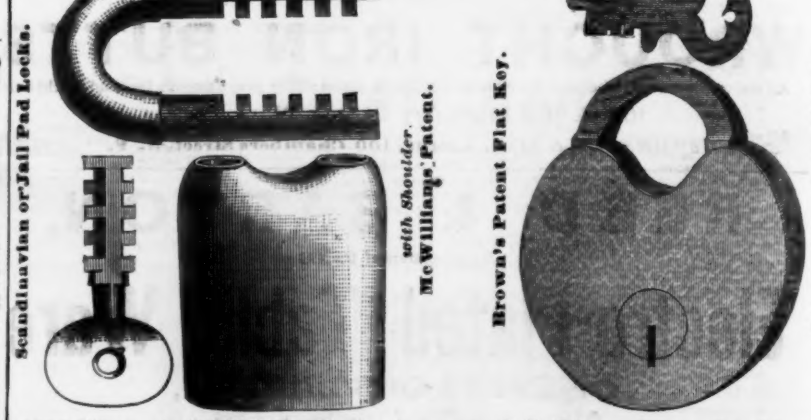
Depot for
THOS. JOWITT & SONS,
(Sheffield, England,)
FILES and HORSE RASPS.
Rough & Ready
And
CLIPPER SCYTHES,
Warranted.

Manufacturers of the

Patented March 4, 1873.

Agents for
Norwich Lock
MFG. CO.
"BEAVER"
(American)
FILES and HORSE RASPS.
"WIDE AWAKE"
AXES.

J. H. McWILLIAMS, Manufacturer of PYES' PATENT PAD LOCKS.



JOHN J. TOWER, Sole Agent, 96 Chambers St, N. Y.

CAPEWELL'S
GIANT NAIL PULLER.
Saves Boxes, Nails and Labor.

Sold by all House Furnishing and Hardware Jobbers.

MALTBY, CURTISS & CO.,

MANUFACTURERS,
34 Reade Street, New York

General Agents for CAPEWELL'S LITTLE GIANT TACK HAMMER

STURTEVANT

Pressure Blowers, Fan Blowers and Exhaust Fans.

10,000 SOLD IN SIX YEARS.

SEND FOR ILLUSTRATED CATALOGUE.

B. F. STURTEVANT, 72 Sudbury Street,
BOSTON, MASS.

BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of **Shank, Socket Firmer, and Socket Framing Chisels,**

PLANE IRONS.

Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 0 per cent. per annum.

Anvils.—Solid Cast Steel ... ₩ lb 14c
Peter Wright's, (Advanced April 1st.) ₩ lb, gold, 11½c
Wilkinson's ... 11c
Eagle ... list 11 cents—dis 20 @ 20&10 %

Apple Parers.—Union ... per doz $7 00
Victor ... 7 75
Domestic ... 7 75
Reading ... 7 75
Bay State Paring, Coring and Slicing ... 15 00
" " Peach Parers ... 16 50

Axes.—Mann's Light ... Per doz. $12 00 @ 11 50
Hunt's Light ... 14 00 @ 12 50
Red Indian, all sizes ... 12 00 @ 11 50
Red Chieftain, all sizes ... 12 50 @ 12 00
Crown Prince ... 12 50 @ 12 00

Augers and Auger Bits.—Pierce's Pat. Twist Bits ... dis 30 %
Douglass' & Ives' Bits ... dis 40&10 %
Connecticut Valley Auger Bits ... dis 40&10 %
Cook's Bits ... dis 40 10&10 %
Jennings' Bits ... dis 30 %
Bates' Nut Augers ... dis 40&10 %
Douglass' & Ives' Augers ... dis 40&10 %
Watrous' Ship Augers ... dis 10&15 %
Bonney's Pat. Hollow Augers ... dis 25 %
Stearns' Patent Hollow Augers ... dis 25 %

Balances.—
Landers, Frary & Clark's / Morton's / Chatillon's } Sold on Morton's new List ... dis 50 %
Common Spring with Hook ... ₩ doz $1 38 @ 2 00

Bells.—Sevin Bros. Mfg Co. Light Hand Bells ... dis 70 %
Common (Tissue Paper Weight) ... dis 70&10 %
Swiss Pattern Hand Bells ... dis 50 %
Connell's Door Bells ... dis 50&5 @ 50&10 %
Gt. Western & Kentucky Cow ... dis 50&10 @ 50 10&5 %

Boring Machines.—Bates' Mfg. Co., complete with augers ... dis 20 @ 25 %
Douglas Mfg. Co., complete with augers ... dis 20 @ 25 %
Common Boring Machines, no Augers ... $4 00 @ 3 75
Angular ... 5 00 @ 4 75

Bolts.—Eastern Carriage Bolts ... dis 75 %
Western ... dis 75 %
Philadelphia ... dis 75 %
" Eagle, (Coleman's) ... dis 60 %
Wrought Shutter, Stanley ... dis 50 @ 50 10 %

Braces.—Barber's ... dis 40&5 %
Backus ... dis 50 %
Bartholomew's American Ball ... dis 10&10 @ 15&10 %
Spoffard ... dis 50 %

Butts.—Cast Fast Joint, Narrow ... dis 35&10 @ 50&10 %
" Broad ... dis 35&10 @ 40&10 %
Cast Fast Loose Joint ... dis 45&10 @ 50&10 %
" Acorn, Loose Pin ... dis 40&10 @ 45&10 %
" Mayers & Parliament ... dis 35&10 @ 40&10 %
" Acorn Jap'd ... dis 45&10 @ 50&10 %
Wrought Loose Pin ... dis 35 %
" Table Hinges and Back Flaps ... dis 35 %
" Narrow ... dis 35 %
" Loose Joint ... dis 35 %
Parker's Blind Butts / Shepard's / Garretson's / Clark's } Discount 60 %; by the case 60&10%.
Lull & Porter's Hinges ... dis 60 %; by the case, 60&5 %
Garretson's Blind Butts Light No. 0 ... } Discount 60 %
" Lull & Porter Pattern } By the case
Cherrytree Blind Butts ... 60&10 %

Chains.—German Halter ... dis 20 %
" Coil ... dis 20 %
Galvanized Pump ... net 13 @ 13½c
Best Proof Coil Chain—
₩ lb ... [illegible] ... 3c gold
By the cask, 560 lbs., ¼c per lb. less Common Chain, ½c per lb. less.

Chisels.—Socket Framing ... dis 60 @ 60&10 %
Socket Firmer ... dis 60 @ 60&10 %
Tang ... dis 40&10 @ 50 %
Beatty's Framing and Firmer ... dis 25 %

Casters.—Iron Bed ... dis 70&10 @ 45 %
Porcelain Wheel Bed ... dis 45&10 @ 50 %
Iron and Brass Wheel Plate ... dis 40 @ 40&10 %
Porcelain Wheel ... dis 40&10 @ 50 %

Clothes Wringers.—Universal ... per doz $72 00
Novelty ... 72 00
Discount on 2 dozen lots, $2 per dozen.

Coffee Mills.—common Box and Side ... dis 15 %
Patent Box and Side ... dis 15 %

Cutlery.—American Pocket (best) ... dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices

Drawing Knives.—Hart Mfg. Co. ... dis 60 %
Adjustable Handle ... dis 15 @ 30 %
Beatty ... dis 15 @ 20 %

Fry Pans.
Tinned ... dis 40 @ 45 %
₩ doz. $3 50 4 00 4 50 5 00 5 50 6 50 7 50 9 00 10 00
No. 0 1 2 3 4 5 6 7 8
Burnished ... dis 40 @ 45 %
₩ doz. $5 00 5 25 4 25 4 75 5 25 6 00 7 00 8 00 9 00
No. 0 1 2 3 4 5 6 7 8

Files.—Nicholson Mill Files ... new list
" Bastard ... "
" Taper ... "
Butcher's Mill (Advanced March 8th) ... $5 25 to $ gold
" Bastard ... 5 25 to $ gold
" Taper ... 5 25 to $ gold

Fluting Machines.
E. F. M.—4½ in. rolls, $6 50 ... dis 15 %
" 6 in. rolls, $6 50 ... dis 15 %
Mrs Knox—4 in. rolls, $5 75 ... dis 15 %
" 6 in. rolls, 7 00 ... dis 15 %

Hammers.—
Yerkes & Plumb's ... dis 15 %
Hammond & Son's ... dis 15 %
Veree ... dis 20 %

Hatchets.
Beatty's ... dis 15 @ 20 %
Shingling and Half. { ₩ doz. $7 00 7 50 7 75 8 00 / No. 1 2 3 4 }
Yerkes & Plumb ... dis 15 %
Shingling and Half. { ₩ doz. $7 00 7 50 8 00 8 50 / No. 1 2 3 4 }
Claw { ₩ doz. $7 50 8 00 / No. 1 2 }

Hinges.
Strap and T. (Changed March 24) ... dis 40 %

Horse Nails. Nos. 6 7 8 9 10
Ausable ... 27 25 24 23 22
Globe ... 26 24 23 22 21
Brundage ... 26 24 22 22 21
Nos. 5 6 7 8 9 10
Putnam ... 32 29 26 25 24 24
On Ausable, Globe and Brundage 1000 lb lots ... dis 5 %

Knobs.—Door, Mortise and Rim.
Makes in Combination ... new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim ... dis 5 %

Locks and Latches.—Rim and Mortise ... dis 40 %
Extra discount for cash 2 %
Till and Cupboard ... dis 25 %
American Padlocks ... dis 40 %
Extra discount for cash 2 %
Scandinavian Pad Locks.
₩ doz. $10 50 10 50 12 00 12 00 13 00 18 00 / No. 9 9½ 10 10½ 11 11½ } dis 15 %
₩ doz. $18 00 18 00 22 00 28 00 / No. 12 12½ 13 13½ } dis 15 %
Trunk Locks ... dis 5&10 %
Thumb and Reversa Latches ... dis 25 %

Lanterns.—Square Candle and Oil ... dis 25 %
Globe for Oil ... dis 25 %
" Kerosene ... dis 25 %
Tubular Lantern ... dis 25 %

Mattocks.—Long and Short Cutter ... dis 25 %
Western Pattern ... dis 25 %
Pennsylvania Pattern ... dis 25 %

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets ... dis 20 %
Stebbins' Gates ... dis 60&10 @ 65&10 %
Lincoln's ... dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum ... dis 25 %
Taylor's Petroleum Faucets ... dis 20&10 %
Brass Liquor Cocks ... dis 20&10 %

Meat Cutters.—Dixon's ... dis 25 %
Woodruff ... dis 25 %
Stowe ... dis 25 %
Hale's ... dis 35 %
Hathers ... dis 25 %

Planes.—Auburn Tool Co. "Bench" ... dis 30 %
Second Quality ... dis 35 %
Metallic Plane Co. ... dis 25&5 %
Evans Pat. Circular ... net

Plumbs and Levels.
Adjustable ... dis 60&10 %
Non-Adjustable ... dis 60, 10&10 %

Plane Irons.—American ... list net
Butcher's ... gold $, 45 30

Picks.—Philadelphia ... net
Pittsburgh ... net

Rules ... dis 60, 10&10 @ 70 %

Rakes.—Cast Steel Garden ... dis 40 @ 40&10 %
Malleable Garden ... dis 40 @ 40&5 %
Wood Head Iron Teeth ... dis 40 %

Steelyards.—American Pattern ... dis 20 %
₩ doz. [illegible]
No. 50 100 150 200 250 300
English Pattern ... dis 10 %
₩ doz. [illegible]
No. 50 100 150 200 250 300
L. F. & C. Excelsior ... dis 10 %
₩ doz. [illegible]
No. 50 100 150 200 250 300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ... ₩ doz $10 00 net
Golden Clipper No. 10, Boxed and Sharpened ... ₩ doz $9 75 net
Green Clipper No. 5, Boxed and Sharpened ... ₩ doz $9 50 net
Common Scythes ... ₩ doz $7 50 @ 9 00

Squares.—Steel and Iron, new list ... dis 50 %

Saws.—Disston's Cross Cut ... dis 30 %
Disston's Hand ... dis 12½ %
W. McNiece & B'd, Cross-Cut & Circ'r, new list ... dis 15 %
Boynton's Lightning, new list ... dis 30 %
" Champion ... dis 25 %

Shovels and Spades.
Rowland's Plain Back, Jan. 23d ... dis 30 @ 35 %
" Back Strap ... dis 30 @ 35 %
Oliver Ames & Sons ... dis 20 @ 25 %
Brady Shovel Co. ... dis 20&5 %

Sad Irons.—Richmond (polished face) ... per lb. 5½c
Richmond (polished face) ... by the cask ... [illegible]

Stone.—Arkansas Oil, No. 1 ... ₩ lb $1 25
Turkey Oil, No. 1 ... 25c
Washita Extra ... 25c
" No. 1 ... 20c
" 2 ... 12c
" 3 ... 5¾c

Screws.—Iron ... new list, Sept. 1st, 1875, dis 30 %
brass ... dis 30 %

Spoons.—
Plated ... dis 40&10 @ 50 %
Britannia, Boardmans (new list) ... dis 50&10 %
" Parkers (old list) ... dis 50 %
German Silver ... dis 30 %
" ... new list dis 35 %
Lalance & Grosjean Iron ... dis 35 %

Springs.—Gray's Door ... dis 50 @ 50&10 %
Torry's Door ... dis 50 @ 50&10 %

Stocks and Dies ... dis 10&5 %

Stove Polish.—Gem ... ₩ gross, $5 00
Onyx ... $5 00

Try Squares.—Winterbottom ... dis 10 @ 15 %
Stanley Rule and Level Co. ... dis 45&10 %
Willis Thrall, No. 2 ... dis 30&10 %
Disston's No. 2 ... dis 40 %

Tacks, &c.—Half Weight Tacks ... dis 72½ %
" by the case ... dis 72½&7½ %
Clout and Finishing Nails ... 7½ %
" by the case ... dis 7½ %

Traps.—Genuine Oneida—Newhouse list ... dis 20 %
Imitation ... dis 30 %

Vises.—Solid Box, currency ... net 14c

Wrenches.—Coes Genuine ... dis 40 @ 40&5 %
Coes Imitation Wrought Bar ... dis 50 @ 50 10 %
" Malleable Bar ... dis 60&10 %
" (Kellogg) Malleable Bar ... dis 65&10 %
Tafts Pattern (Wrought Bar) ... dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex ... dis 25 %
" Improved Baxter ... dis 25 %
" Adjustable Fork ... dis 25 %

Wire.—No. 0 to 18 ... (Advanced April 24th) ... dis 40 %
No. 19 to 26 ... dis 47½ %
No. 27 to 36 ... dis 52½ %
Coppered to 12 ... dis 15 @ 20 %
Tinned Broom Wire ... dis 25 %
Galvanized Wire No. 1 to 18 ... dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
August 9, 1875.

Augers—Snell Mfg. Co. ... dis 25 %
Axes—Fancis ... 11 50
Bits, Auger—Snell Mfg. Co. ... dis 25 %
Phoenix ... dis 40 %
Bells, Cow—Yaw's Genuine ... dis 30 %
Braces—Bit, Spofford's Patent ... dis 50 %
Brads, Cut ... dis 50&7½ %
Boards—Stove, Brooks' Pat. dis 30 % 4 mos.; 35&5 % 30 dys
Butts—Brass ... dis 30 %
Wrought Narrow ... dis 30 %
" Broad, Loose Joint ... dis 35 %
" Table and Back Flaps ... dis 30 %
Wrought Butts, Loose Pin ... dis 35 %
Belting—Rubber ... dis 30 @ 10 %
Leather, new list, oak tanned ... dis 20 %
Brick—Bath (box of 2 doz) Best English ... $1 25
" Unimerford ... $1 00
Can Openers—Sprague's ... dis 50 %
Cases—Parlor Coal Hod ... dis 15 %
Chalk—White, Carpenter's ... ₩ gross, 57c
Red, Carpenter's ... " 90c
Chisels—Firmer Socket ... dis 60, 10&10 %
Framing Socket ... dis 60, 10&10 %
Corner Socket Chisels ... dis 60, 10&10 %
Slick's Carpenters' ... dis 60, 10&10 %
Castings—Malleable ... ₩ lb 9½c
Egg Beaters—"Peerless" ... per doz $8 50
" Centripetal ... per doz 5 00
Elbows—Corrugated / Charcoal / Russia } dis 10 %
$3 50 4 00 5 25 6 50
7 00 9 50 12 00 14 00
Files—Nicholson Bros. ... dis 50 %
Fluters—Geneva Hand ... doz. $15 00
Freezers Ice Cream—"Champion ... dis 33⅓ %
Hammers—Henry W. Kip's ... dis 10 %
Hinges, Gate—Shepard's ... dis 30&10 %
Hinges—Window Blind—
Shepard's and Standard ... dis 60&10 %
Wrought Strap and T ... dis 60&10&5 %
Hods, Coal—Plain, Black and Galvan'd ... new list dis 15 %
Funnel, Black and Galvanized ... dis 15 %
Fancy and Helmet ... dis 15 %
Sad Irons ... 3¼c
Kettles—Brass ... ₩ lb 45c
Copper, "Hand Made" ... 38c @ 40c
Enameled ... dis 50&10 %
Knives, Drawing—Oval No. 1 ... dis 60, 10&10 %
Razor Blade ... dis 60&10 %
Lanterns "Peerless" ... No. ... ₩ doz $26 00 $10 50 $13 75 dis 10 %
Tubular ... $11 00
" with Guards ... 11 50
Machines—Apple Paring, "Keystone" ... 7 75 ₩ doz
Machines—Boring, Snell's ... dis 20 %
Mills, Coffee—Box and Side, common ... dis 15 %
Box Union and Eagle ... dis 15 %
" American ... dis 20 %
Molasses Gates—"Self Measuring" ... dis 20 %
Nails—Clout and Finishing ... dis 7½ %
Shoe ... dis 7½ %
Horse, Ausable ... No. 5 7 8 9 10 / 30 27 25 24 23 22c
" Pointed & Polished ... and 1c ₩ lb
" 1000 lbs ... dis 5 %
" Clinton ... No. 5 6 7 8 9 10 / 21 19 18 17 16c
Packing—Rubber ... dis 30 @ 10 %
Paint—White Lead, U. S. Gov't ... ₩ lb 8½c
Pans—Dripping ... ₩ lb 10c
Rivets—Iron, Black and Tinned ... dis 25&7½ %
Screws—"American Screw Co"—
Flat Head, Iron ... dis 62½ %
" Flat Head, Brass ... dis 52½ %
Skates and Straps—White's ... dis 20 %
Spoons, Iron Tinned ... dis 10 %
" by the case ... dis 20 %
Plated Rogers' A No. 1 ... dis 50 %
Britannia ... dis 50&10 %
Squares—Steel and Iron ... new list 50 %
Scales—Buffalo Scale Works ... dis 25 %
Fairbanks ... dis 15 %
Stove Polish—Gem ... ₩ gross, $4 50
" Dixon's ... 6 00
Tacks—Half Weight Am. Iron ... dis 72½&7½ %
Tacks—Peace Coat ... dis 15 %
Vises—
Parallel, Buffalo—Old pattern, dis 30 %; new, do. dis 20 %
Ware—French, Tinned and Iron ... dis 20 %
Stamped and Japanned ... dis 5 %
Cast Iron Hollow ... dis 40 %
Wire—Bessemer Steel ... dis 10 %

Tin Plates.—Add for each X ... 2 50
10x14, IC. Charcoal ... $10 00 | 14x20 IC. terne ... $9 00
12x12 ... 10 50 | 20x28 C. ... 20 00
12x17 ... 9 50 | 20x28 X. ... 25 00
14x20 ... 11 00

Pig Tin—Straits ... 24c @ 25c
Bar Tin ... 26c
Solder—No. 1, Crook's ... 16 c
Sheet Zinc—Lewis ... 370 lb casks ... [illegible] ₩ 100 lbs
Sheets ... $10 75
Babbitt Metal ... ₩ lb 12c
Iron Wire—Bright and Annealed ... dis 45 %
Coppered ... dis 40 %
Tinned ... dis 25 %
Tinned Broom { Nos. 20 21 22 / 30c 85c 80c } ... dis 25 %
Copper—Sheathing 14 @ 18 oz ... ₩ lb 30c
Finished ... 87c @ 39c
Bolts ... ₩ lb 33c
Braziers' Sheets ... 31 @ 33c
... 31 @ 33c
Sheet Iron.—
18 Common ... $4 05
24 " ... 4 25
26 " ... 4 45
27 " ... 5 00
W. D. Wood & Co. Smooth Plain ... A. B.
Am. Russia ... 14c 11c
Gen. Russia, No. 1 stained ... 16½c
" " clean ... 15½c
Galvanized ... dis 30 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.
August 2d, 1875.

Tin Plate.—I. C. 10x14 Charcoal ... $10 50 @ 11 50
I. C. 12x14 Charcoal ... 12 50 @ 14 00
I. C. Terne 14x20 ... 9 50 @ 11 00
I. C. Terne 20x28 ... 20 00 @ 22 00
I. C. 20 inches Continuous ... 21 00
Block Tin.—
Pig ... ₩ lb 26c
Bar ... ₩ lb 27c
Solder.—
A ... ₩ lb 16c
Roofing ... ₩ lb 17c
Plumbing ... ₩ lb 21c
Lead.—Pig ... 7c @ 7¼c
Bar ... ₩ lb 8½c
Copper.—
Ingot ... @ 24c
Planished ... [illegible]
Sheathing ... [illegible]
Copper Drops ... [illegible]
Sheets, 8 to 9 lb ... [illegible]
" 10 to 11 lb ... [illegible]
" 12 to 13 lb ... [illegible]
" 13 lb. up ... [illegible]
Copper Bottoms ... [illegible]
Zinc.—Cask, 500 to 1000 lbs ... [illegible]
Case, 100 lbs ... [illegible]
Slab ... [illegible]
Brass.—Roll, No. 6 to 30 ... [illegible]
Roll, No. 30 to 36 ... [illegible]
Wire, No. 6 to 20 ... [illegible]
" 20 to 26 ... [illegible]
Babbit Metal.—Sellew & Co. ... [illegible]
Allens' ... [illegible]
Market ... [illegible]
Antimony ... [illegible]
Bismuth ... [illegible]
Nickel ... [illegible]
Russia Iron.—Bundle ... [illegible]
Less than bundle ... [illegible]
Sheet Iron. Com. B. / Smooth Fin. S. L. U. / Smooth D Re'fd.
15 to 20 ... [illegible]
22 to 24 ... [illegible]
25 to 26 ... [illegible]
27 ... [illegible]
28 ... [illegible]
Galvanized Iron.—Full bundles ... dis 27½ %
Nos. 16 to 20 ... No. 26 ... [illegible]
" 22 to 24 ... No. 28 ... [illegible]
Bar Steel.—Silver, ₩ lb 16c Crescent, 21c.
Iron Wire ... dis 35 %
Enameled Ware ... dis 50 %

One Piece Corrugated Elbows ... dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch ... ₩ doz	$2 50	4½ inch ... ₩ doz	$5 00
5 "	3 50	5 "	7 00
5½ "	4 50	5½ "	7 50
6 "	5 25	6 "	12 00
7 "	6 50	7 "	14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₩ doz.		₩ doz
2-inch	$1 75	2½-inch	$2 75
3-inch	2 25	3½-inch	3 25
4-inch	2 50	4½-inch	3 50

Sheet Iron Bread Pans ... ₩ lb 8½c
American Broilers ... ₩ doz. $18 50
Tinmen's Machines ... dis 5 %
Sad Irons ... ₩ lb. 3½ @ 3¾c
Brass Kettles.—Ansonia ... 45c
Dog Irons ... 3½c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 2·5c. rate, 2 % off net.

Flat Rail (1¼x¼), punched and coun'sunk .. 4·1c ₩ lb net
Iron Wedges ... 4½c ₩ lb net
Norway Nail Rods ... 8½c ₩ lb net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point) ... 4¾c ₩ lb net
Beetle Rings ... 8 c ₩ lb net
Fence Pickets—
⅜ round, bent to shape, 25c ₩ ft. of fence, less 15 % off net.

Discount off Standard List.

Carriage and Tire Bolts ... 75 % off net
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.
Stove Bolts ... 20 % off net
Machine and Square Head Bolts ... 40&10 % off net
Coach and Lag Screws ... 40&10 % off net
Bolt Ends ... 40 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in ... 8½c ₩ lb off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in ... 6¾c ₩ lb off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in ... 9¾c ₩ lb off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅜ in ... 7½c ₩ lb off net
Nuts and Washers in 25 lb. boxes, ¼c ₩ lb ex. Nuts and Washers in lots less than one keg each size, ¼c ₩ lb ex. Nuts and Washers in 5 lb. boxes, 1c. ₩ lb ex. net prices.
Standard Caps, for Plows ... 5¼c. ₩ lb net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 3½c ₩ lb net; ⅞, ¾ in. diam. 3¾c ₩ lb net; ⅝ in. diam. 3¾c ₩ lb net.
Patent Headed Harrow Teeth, packed in boxes ¼c ₩ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₩ lb net; 9-16 in. diam. 6c ₩ lb net; ½ in. diam. 7c ₩ lb net. 1c ₩ lb extra when less than 1 keg of each size is ordered.
Strap & T Hinges ... 33⅓&10 % off net, delivery as custo'ry
Screw Hitching Rings ... $5 25 ₩ 100 net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long ... ₩ lb 3¾c net
1 to 2 in. diam. from 4 to 8 ft. long ... " 4 c net
1 to 2 in. diam. from 1½ to 4 ft. long ... " 4¼c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long ... " 4½c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 5 c net
Bridge bolts with upset ends ... ¼c. ₩ lb extra
Wrought iron plates, punched ... 4¾c. ₩ lb net
Cast Iron Washers ... ₩ lb 3¾c net
Duck Nest Tuyere Irons ... $14 50 ₩ doz net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End, ₩ set of				8 bolts	45c
12 "	½	"	"	8 "	55c
10 "	9-16	"	"	8 "	65c
12 "	9-16	"	"	8 "	70c
14 "	9-16	"	"	8 "	80c
10 "	⅝	"	"	8 "	80c
12 "	⅝	"	"	8 "	80c
14 "	⅝	"	"	8 "	90c
16 "	⅝	"	"	8 "	1 00
18 "	⅝	"	"	8 "	1 10
20 "	⅝	"	"	8 "	1 20

5c ₩ set for each additional inch over 14 in All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each ... 15c
" " wide track, each ... 17c
Single Tree Irons, ₩ set of four pieces ... 30c
Wrought Iron Bolster Plates, 2½ in. wide, ₩ set ... 45c
" " 3 " " ... 50c
" " 3¼ " " ... 55c
" " 3½ " " ... 60c
Wagon Brake Ratchets, each ... 14 c
" " " finished with guard, each ... 40 c
Wrought Hammer Straps, heavy pattern, each ... 18 c
" " " light " each ... 12 c
" Rub Irons, each ... 9 c
Stay Chain Hooks, each ... 5½c
Double and Single Tree Clips, figure 1, each ... 8 c
" " " " 2, each ... 9 c
" " " " 3, each ... 11 c
Axle Clips, Round Part ⅝, Flat Part 1¼, each ... 8c
Wagon Clevis, including Pin, complete, each ... 10c
Pole Caps, each ... 24c
Single Tree Hooks, Nos. 1 and 2 ... 4½c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clevis and Pin, Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets ... dis 15 %
Wagon Box Staples, 1½ to 2½ in. to clinch. ₩ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on. ₩ 1000 7 50 net
Neck Yoke Eyes, each ... 4½c net
" " with ⅜ rings, each ... 7½c net
King Bolts, ¾, 1, 1⅛, and 1¼ in. diam ... ₩ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths ... " 8½c net
Wagon Rivets, 3-16 in. diam., all lengths ... " 9½c net
" " ⅜ to 1 inch long ... ₩ lb 1c extra
" & Nails, in 5 lb paper boxes ... " 1c extra
" " in 25 lb wood " ... " ½c extra
Wagon and Hinge Nails, ¼ in ... ₩ lb 17 c net
" " " 3-16 in ... " 19 c net
Wagon Rivets and Nails, in less lots than one keg each size ... " ½c extra
Double Tree Plates ... " 5c net
Coupling " ... " 5c net
Tongue " ... " 8½c net
Neck Yoke Plates ... " 10½c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ lb as Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in, ₩ lb 10½c net. ¼ in., 11½c. net
Above prices are free on board cars in Pittsburgh. Subject to change of market, without notice.

DETROIT.

(Reported by Messrs. Jewett & Root.)
August 30, 1875.

Tin Plate.—Best Charcoal		**Pig Tin.**—	
IC. 10x14	$10 25	Large Pigs	24c
IX, 10x14	13 00	Small Pigs	25c
XX, 10x14	15 75	Bars	26c
IC. 12x12	10 75	**Bright Wire.**	
IX. 12x12	13 50	63 lbs. in bdl ... dis	—
IC, 14x20	11 25	**Copper.**—	
IX. 14x20	14 00	Sheathing	31c
XX. 14x20	16 75	Copper Bottoms	32c
XXX. 14x20	19 50	**Planished Copper.**—	
XXXX. 14x20	22 25	Sheathing, 14x48	38c
DC. 100 Plate	9 75	Boiler Size, No. 7	40c
DX. "	12 50	" " No. 8	40c
DXX. "	15 25	" " No. 9	40c
DXXX "	18 00	**Sheet Iron.**—	
DXXXX 100 Plate	20 75	No. 18 Am. Com	4 00
IX, 14x14	21 50	No. 24 Am. Com	4 20
IC. 10x14 W	9 75	No. 26 Am. Com	4 40
IX. 10x14 W	12 50	No. 27, Am. Com	4 60
Roofing Tin.—Best Char.		W. D. WOOD'S & CO.'S SHEET IRON.—	
IC, Terne, 14x20	$ 9 50	Nos. 15 to 20 Smooth	$5 00
IX. " 14x20	12 25	" 21 to 24	5 20
IC, Terne, 20x28	20 00	" 25 & 26	5 40
IX. " 20x28	25 00	" 21 to 24 Char'l	6 70
Coke Tin.—		" 25 & 26 "	6 90
IC, 10x14 Coke	$ 9 25	RUSSIA.	
IX, 10x14, Coke	12 00	Genuine	17c
IC, 14x20, "	10 25	Imitation	14c
Solder.—No. 1	16c		
No. 2	15c		

Steel.

BOSTON.

(*Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.*)

Augers.—Watrous Ship....dis 10 %
L'Hommedieu Ship....dis 15 %
Axes.—Forester's Favorite, Bronzed....$12 00
Blue Jackets, Blue....11 5
Excelsior, Black....11 00
Chopper's Pride, Bronzed....10 50
Red Cross, Red....10 00
Red Cross, Handled....12 50
Boy's Handled Blue Jackets....12 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ℔ doz
Bells, Sleigh—
Fancy Body, Patent Leather, Cloth Bound, White Metal, 30, No. 1....$1·70
Fancy Body, Patent Leather, Cloth Bound, White Metal, 36, No. 1....1·80
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 30, No. 1....·98
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1....2·50
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1....3·38
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1....3·50
Shaft, Strap, White Metal, House Bells, extra, 6, No. 1....per pair, 50c.
Common, 6, No. 1...." 45c.
Blind Hinges.—
Orr or Washburn's....per hundred sets $9 50
Blind Fasts.—
Orr or Washburn's....per hundred set $6 00
Bolts.—Carriage. Phila.. "Girard Works....dis 50&10 %
Borax.—Best Refined....℔ ℔ 15c
Borers.—Angle. Backus'....dis 30 %
Boring Machines.—Angle....each $4 75
Common. Snell's quality....each 3 75
Braces.—Barber's....dis 40&5 %
Backus'....dis 50 %
Spofford's....dis 50 %
Amidon....dis 50 %
Brackets.—Star Bronzed....new list net
Star Japanned....new list net
Store Shelf....new list net
Brass Faucets.—L. F. & C....dis 25&10 %
Butts.—Union Drilled Loose Joint....dis 45&10 %
" " Wire Fast Joint....dis 25&10 %
" " Acorn Loose Joint....dis 45&10 %
Brass Butts....dis 30 %
Wrought Table Butts and Back Flaps....dis 30 %
Wrought Narrow Butts....dis 30 %
Can Openers—Sprague's....dis 50 %
No. 1, Iron Handle....$4·00
No. 2, Wood Handle....4·50
Cartridges.—"U. S. Cartridge Co."....dis 50&10 %
Chisels.—"Buck Bros." Shar Goods....add 20 @ 22½ %
Socket....add 22½ @ 25 %
Churns.—Lightning—
Redheffer patent.... 3 4 5 6 gall
per doz $22 00 $27 00 $31 50 $36 00
Coal Hods....dis 40 %
Fancy Japanned, No. 4, 15 in., $8·00; 5, 16 in., $9·00; 6, 17 in., $10·00.
Fancy Galvanized, No. 4, 15 in., $11·50; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Galv'd, No. 4, 15 in., $15·00; 5, 16 in., $16·00; 6, 17 in., $17·00.
Morning Glory, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Morning Glory, Galv'd, No. 4, 15 in., $15·00; No. 5, 16 in., $16·00; No. 6, 17 in., $17·00.
Compasses and Dividers.—Bemis'....dis 25 %
P. S. & W....dis 25 %
Cordage.—Manila (usual trade dis.)....℔ ℔, 15c
American Tarred Hemp Lath Yarn....℔ ℔. 10c
Corn Hooks....per doz $2·75
Cow Ties....dis 10 %
No. 30, Open Ring, 3 foot, No. 6, with Toggle....$3·70
No. 35, " 3 " No. 6, " Snap....3·90
No. 40, " 3½ " No. 5, " Toggle....4·25
No. 45, " 3½ " No. 5, " Snap....4·40
No. 50, " 4 " No. 4, " Toggle....4·85
No. 55, " 4 " No. 6, " Snap....5·00
No. 60, " 4½ " No. 3, " Toggle....5·60
No. 65, " 4½ " No. 3, " Snap....5·90
Crow Bars.—Iron. Steel Points....℔ ℔, 5½c
"Sweet" Steel Bars....℔ ℔ 11c
Brown's Steel Bars....℔ ℔ 10c
K. F. & Co. Extra Drill Steel....℔ ℔ 15c
Dividers.—Cook's Nickel Plated....dis 15 %
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00....dis 25 %
No. 8, " outside " $18·00....dis 25 %
Torrey's....$4·00
Gem....1, $4 00; 2, $3 50; 3, $3 00 ℔ doz
Egg Beaters.—Lightning, Redheffer pat. 1 qt.. 4 qts.
per doz $8 00 $12 00
Emery.—Alden....℔ ℔ 6½c
Wellington Mills....℔ ℔ 10c
Files.—Earl Smith & Co.'s English....$5 to £ gold
American....$5 to £ currency, less 12½ %
Nicholson....new net list
Wheeler, Madden & Clemson....£5 net
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62, 4, $1·88; 4½, $2·13; 5, $2·50.
Funnel Irons.—$2·50 2·50 2·50 3·25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3·50 3·75 4·00
5, 5½, 6 inch.
Hammers.—Maydole....dis 12 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $9·75
" " " " " " bell face, No. 1, $11; 1½, $9·75.
Hangers & Rollers.—Novelty....dis 30 %
Anti-Friction....$1 75 per pair—dis 30 %
Hatchets.—Underhill Edge Tool Co....dis 15 %
C. F. Dowse, warranted Cast Steel—
Shingling....0, $4·75; 1, $5·25; 2, $5·75
Claw....1, $5·75; 2, 6·25
Lathing....1, $5·50
Axe Pattern....1, $7·00; 2, 7·50
Broad....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75.

Hinges.—Strap and T. Stanley Works....dis 33⅓&10 %
Plate, Loose and Fast Joint....℔ ℔ 6c
Wrought Screw Hook....℔ ℔ 6½c
Knobs.—Young's imp. Silvered Glass....dis 45 %
Lanterns.—Tubular No. 0....$11·00
Guarded No. 74, (with kerosene oil and candle burners)....6·25
Anti-Tubular....8·00
Lead.—Sheet and Pipe....less 10 %
Locks.—Norwalk Lock Co....dis 40&5 %
Mattocks.—
K. F. & Co. axe finish, long cutter....$13 00—net
Short cutter....12 75—net
Meat Cutters.—"Miles's" Challenge....dis. 20 %
Metal.—Babbitt. No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ℔ ℔
Nails.—10d and larger....$3 25 net
Nail Pullers.—Little Giant—Small....per doz., $22·00
Little Giant—Large....30·00
Padlocks.—Wilcox....dis 40&5 %
All Brass, 2⅜ inch, 2 keys, job lot....$9 00
Paper.—Tar'd Sheathing....℔ ℔ 2 c
Dry Sheathing...." 3½c
"Beaver Brand" Rosin Sized.. " 4½c
Tar'd " " 3½c
Felt " " 4½c
Virginia Cane Fibre....4½c
Picks.—K. F. & Co., Solid Eyes....5 to 6 6 to 7
$9 00 $9 50
Pins.—Universal Hatband Coat all wood—
2 in....℔ gross $2·50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger.—
"Partridge," 6 square tine....℔ doz $12 00
Shumway & Co., 6 round tine....℔ doz 9 00
Pulleys.—Axle.
Frame Pol. Wheel....No. 150, 50c., 1⅛ in.; 16, 38c., 2 in.
Common Axle....No. 1, 25c., 1¾ in.; 2, 40c., 2 in.
Milled Axle....No. 2, 45c., 1⅞ in.; 2, 50c., 2 in.
Nashua Pat. Axle Bronzed Face....1⅞ in., 90c; 2 in., 90c
Cast Steel Axle....2 in., $1·00
Pulley Blocks.—"Best Boston Make"....net
Common Strapped Blocks—
4 5 6 7 inch.
Single, 75c. 88c. $1·00 $1·13 each.
Double, $1·00 1·12 1·25 1·60 "
Inside Iron Strapped Blocks—
5 6 7 8 9 10 inch.
Single $1·00 1·13 1·38 2·00 2·25 1·75 each.
Double 1·88 2·50 2·62 2·75 4·00 5·00 "
Inside Iron Strapped Blocks, with Patent Roller Bushings—
5 6 7 8 9 10 inch.
Single, $1·25 1·50 1·65 2·50 2·65 3·50 each.
Double, 2·50 3·00 3·38 4·63 5·00 6·50 "
Plated Ware.—Rogers bros....dis 50 %
Plumb & Levels.—"Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels....dis 50 %
No. 2, First Quality Levels....dis 60&10 %
No. 3, Iron Pocket....dis 35 %
No. 4, Level and Plumb Glasses....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge
No. 6, Improved Iron Bench Planes....dis 50&10 %
Pocket Knives.—Conn. Cutlery Co....new net list
American Shear Co....dis 33⅓ %
Rail Barn Door.—For Novelty and Anti-Friction Hangers....per foot 7c.—dis 30 %
Rivets.—Black....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8
12 14 14 14 14 16c ℔ ℔ net
Rubber Moldings.—"Harmon's"....dis 10 %
No. 2, for Windows....per foot, 5c
No. 3, for Doors....per foot, 10c
No. 4....per foot, 12c
Sad Irons.—Bless & Drake....℔ ℔ 4c
Sand Paper—0 to 2, $4·25; 2 to 3, $4·75....dis 10 %
Saws.—Band and Panel—
Wheeler, Madden & Clemson's, same list as "Disston's"....dis. 15 %
Disston's....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts....per ft., 37c
" "Star" X Cuts " 60c
" "Champion X Cut. " 50c
" "One Man X Cut..each, $2·25
Boynton's genuine Lightning X Cut....per ft., 60c
" "One Man X Cut..each, $2·25
Circular—Wheeler, Madden & Clemson's....dis. 25 %
Mill....dis. 25 %
Scythes.—Am. Screw Co., new list Sept. 1st....dis 30 %
Alken's....dis 30 %
Scythe Snaths.—
"Willoughby Lake," first quality....℔ gross $6·50
" second quality....3·00
Shovels.—O. Ames....dis 20 %
M. B. & D....dis 20 %
Snow, Malleable Iron Tip, D Handle—Agents for New England....$6·50
Snow, Malleable Iron Tip, long Handle—Agents for New England....5·50
Sifters.—Coal, Rice, &c....$12 00
Spading Forks.—M. & E....dis 25 %
Stone Pickers.—"Partridge," original....℔ doz $15 00
Tools.—Alken's Pattern, 20 in set; Parr's....$6·00 per doz
Traps.—Oneida....dis 25 %
Blake's....dis 50 %
Vises.—K. F. & Co.'s Solid Box. Blacksmith....℔ ℔ 13c
Parker's Parallel....dis 10 %
Backus....dis 25 %
"Howard's" Parallel....dis 20 %
Wardrobe Hooks.—Wire to drive....℔ gross $1 00
Weather Strips.—"Harmon's"....per doz 5, dis 10 %
Weights.—Window Weights....℔ ℔ 2c
Wedges.—Axe....℔ doz 38c
Wire.—
Eureka, in spools, No. 26 to 40 assorted....℔ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black....℔ ft 5½c
Wrenches.—Genuine Wrenches, G. A. Coes....dis 40&5 %
Walton....dis 50 %
Wringers.—
Novelty and Universal } Tub No. 2 { Less than doz, $72 00; 2 doz or more, 70 00
Bench A.... less than 2 doz $86 00; 2 doz or more $84 00
" B.... " 94 00 " 92 00
" B.... " 110 00 " 107 00
Eureka....per doz $58 00
Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c....dis 33⅓ %

Boston Metal Market.

(*Corrected by Fuller, Dana & Fitz, 110 North Street, Boston, Importers and Commission Merchants.*)

September 1, 1875.

Iron.—Best Refined Bar Iron....℔ ton $60 00
"Burden Best"....95 00
Swedish Bar Iron....gold 110 00
Norway Shapes....gold 125 00
Norway Nail rods....gold 130 00
Sheet Iron, American....℔ ℔ 4½c
" Galvanized....9 c
" Russian....gold 13½c
" Banca....3½c
Plate Iron, C. No. 1....$60 00
Iron Rails....℔ ton 77 50
Steel Rails....28 00
Pig Iron, Found'y, No. 1 extra....25 00
" No. 2 extra....28 00
" Grey Forge....
" Scotch....30 00 @ 32 00
Wrought Scrap Iron....31 00
Old Rails....28 00
Steel.—
Eng. Tool, gold 15½c | German....℔ ℔ 9½c
American Tool 14½c | Spring....5 c
" Mach 9½c | Sleigh Shoe....6 c
Bessemer....11c | Toe Calk....4½c
Tin Plates.—℔ box, gold | **Copper.**—7½c
I. C. Char. 10x14....$8 00 | Ingot....℔ ℔
I. C. Coke 10x14....7 25 | Bolt....23½c
Char. Roof. IC. 14x20. 7 50 | Sheathing....30c
Coke " IC. 14x20, 6 50 | Braziers....30c
METALS. | **Lead.**—℔ ℔
Pig Tin.—℔ ℔ gold | Pig....7½c
Banca....25c | Sheet & Pipe....8·35
Straits....19c | **Zinc.**—Sheet....10c
English....19c | **Spelter**....℔ ℔ 7½c
Antimony, gold ℔ ℔ 12½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror....℔ doz, $7 75
Hudson's Rotary....7 75
Axes.—Wm. Mann's, Red Warrior....℔ doz $11 50
Wm. Mann's, W. Stewart's....11 00
" C Marshall....10 50
" Handled....$5 extra
" Double Bitted....2 50
H. L. B. & Co.'s, L. & W....11 50
" Pioneer....12 00
" James & Co....11 00
Hunt's....12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles....dis 10 & 5 %
Common Axles (Pat. Lubricating) 1⅛ inch and upward....℔ ℔. 6½c.
do. less than 1⅛ inch...." 7 c.
Bellows.—Blacksmith....20&2½ %
Bells.—Troy, Church, School and Farm Bells..℔ ℔ 44c
"Improved Amalgam Bronzed," 15 in., $3·00; 17 in., $7·00; 19 in., $9·00....net
Belting.—"Boston Belting Co.'s" Rubber..dis 9&7½ %
"Star"....dis 30 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire..dis 70&10 %
Arms, Bell & Co.'s Machine....dis 30&10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint....dis 25&10 %
Broad "....dis 30&10 %
Loose "....dis 45&10 %
Reversible....dis 40&10 %
Japanned and Silver Tipped....dis 45&10 %
Loose Joint "Acorn"....dis 45&10 %
Wheeling Hinge Co.'s W't Fast Joint Narrow....dis 30 %
Broad....dis 35 %
Loose Joint....dis 35 %
Reversible....dis 35 %
Table & B'k Flaps....30 %
Churns.—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50....dis 25 %
Cider Mills.—American Senior, $40·00; Am. Junior, $25·00....dis 20 %
Corn Knives.—Dunn Edge Tool Co.'s Clip....℔ doz 5 00
Seymour Mfg. Co.'s Solid Steel Back....4 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers....dis 10 %
Hand Shellers....special rates
Cotton Gins.—The Carver, 10 in. Saw, $4 a Saw..dis 15 %
12 in. Saw, $4·50 a Saw....dis 10 %
Crow Bars.—Steel Pointed....℔ ℔ 6½c
Drag Saw Machines.—
Cutler's Iron Drag Saw....dis 10 %
Robinson's Patent Sweepstakes Drag Saw....dis 10 %
Fanning Mills.—Nasso & Cutt....dis 20 %
Feed Cutters.—Improved Buckick Nationals....dis 20 %
Sandwich Mfg. Co.'s No. 2, $8·00....net
Files.—Black Diamond, Mill....$5·00 £ currency.
Bastard....5·00 £ currency.
Taper....5·00 £ currency.
Nicholson's....dis 12½ %
Forges.—Keystone Portable Forge Co.'s....dis 33⅓ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks....dis 33⅓ %
Handled Hoes....dis 33⅓ %

Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe....dis 5 %
" Planet Drill, Nos. 2 and 3....dis 15 %
" Combined Drill and Wheel Hoe....dis 15 %
Grinding Mills.—Challenge Feed Mills....dis 15 %
Sedgebeer's Nonpareil Mills....dis 15 %
Hammers.—Masons' Hammers....℔ ℔ 20c
Smiths' Hand....20c
Handles.—No. 1 Fork, Hoe and Rake....dis 20 %
No. 2 Fork, Hoe and Rake....dis 40 %
Harrow Teeth.—1 inch iron....℔ ℔ 4½c
⅞ and ¾ inch iron....4¾c
Barbed or Headed....½c extra
Hay and Cotton Presses.—
Dederick's Railroad....net list
" Perpetual....net list
Hay Knives.—
Dunn Edge Tool Co.'s....℔ doz $15 00—dis 15&5 %
Lightning (Weymouth's Patent)....℔ doz $20 50
Hinges—
Wheeling Hinge Co.'s Strap & T....dis 33⅓&10 %
Horse Hay Fork.—Nellis' Harpoon....dis 25 %
Horse Nails.—National Patent Pointed....20c rates
National Patent Pointed, extra finished....21c "
Horse Powers.—Pitts or Carey's Patent....dis 10 %
Wheeler's Railway....dis 10 %
Sandwich Lever....dis 10 %
Horse Rasps.—Heller Bros....dis 45 %
"Black Diamond"....$6·00 to the £ currency
Horse Shoes.—
Rhode Island (Perkin's Pattern)....℔ keg, $5 50
" Mule...." 5 50
" Trotting Shoes....8 00
Tredegar Horse....per keg $5 50
" Mule....per keg 6·00
Hose.—
Boston Belting Co.'s Rubber Medium Sizes..dis 30&10 %
" " Small Sizes, Hydrant....dis 40 %
Ice Tools.—W. T. Wood & Co.'s Saws....new list net
W. T. Wood & Co.'s Chest Hatchets....new list net
" " Axes....new list net
" " Loading Tongs....new list net
" " Medium, Small and Family Tongs....new list net
" " Chisels, Hooks and Grapples....new list net
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....℔ doz $13 00 @ 13 50
" Grub Hoes, oval eye...." 10 00 @ 11 50
Money Drawers.—
Pierpont & Co.'s Excelsior....per doz $40·00 net
Nails.—Wheeling....$3 45 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure....dis 25&5 %
" " No. 2 Plain....dis 40 %
" " Round and Square....dis 10&10 %
Picks.—Klein, Logan & Co.'s Railroad and Clay....℔ doz $9 30 @ 11 00
Klein, Logan & Co.'s Coal...." 7 45 @ 8 40
" " Poll...." 12 60 @ 15 50
" " Stone...." 14 40 @ 14 90
" " Tamping...." 14 75 @ 15 25
" " Miners' Drifting...." 10 25 @ 12 80
Plows.—Avery's Cast and Steel....dis 20 %
Collins Cast Cast Steel....new list net
Pekin Steel....new list net
Post Hole Augers.—Clark's Patent—
No. 1, ℔ doz. $27; No. 2, $30; No. 3, $32....dis 20 %
Pulleys.—5 inch....per doz $4·25 net
4 inch....per doz 3·25 net
Nellis' Patent....new list dis 15 %
Pumps.
St. Louis, Farm, Patent Metal Lined...new list dis 50 %
Rakes.—Paddock's Premium Sulky....$28 00 net
St. Louis Revolving 14 tooth....4 65 net
" " 16 "....4 90 net
" Hand Hay Rake....dis 20 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives....dis 40 %
" " Sections....dis 40 %
Road Scrapers.—Steel....dis 25 %
Cast Iron....dis 10&5 %
Sad Irons.—Monitor Brand, Silver Polished..℔ ℔ 4½c
Sash Weights.—Standard Solid Eyes....℔ ℔ 4c
Saws.—Curtis & Co....dis 10 %
Scythes.—Dunn Edge Tool Co.'s....new list dis 20&5 %
Scythe Stones.—No. 1 Ind'n Pond ℔ gr's, $7 00 } dis 25 %
Extra Indian Pond...." 7 50
Premium...." 10 50
Diamond Grit...." 13 00
Shovels and Spades.—Myers & Armor....dis 15 %
O. Ames & Son....dis 12½ %
Grain Scoops, Pat. Corrugated Straps M. & A. dis 15 %
" " " T. Rowland's dis 15 %
" " " O. Ames & Son dis 12½ %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished....℔ ℔ 15c
Solid Cast Steel...." 35c
Snaths and Cradles.—Seymour Mfg. Co.'s..dis 20 %
Sorghum Machinery.—Bell Cane Mills....dis 15 %
Scantlin's Seamless Evaporators....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express....dis 12½ %
Blue Seat Springs....dis 15 %
Vises.—Solid Box....℔ ℔ 16c
Wilson Mfg. Co.'s....dis 15 %
Wheelbarrows.—Railroad & Garden....new list net
Wrenches.—Coes' Genuine....dis 33⅓ %
Coes' Pattern....dis 50
Wagons.—Whitewater Farm Wagons—
Thimble Skein....No. 3, $76; 3¼, $80 3½, $81
Iron Axle....No. 1½, $80; 1¾, $88 1⅞, $90

St. Louis Metal Market.

(*Corrected Weekly by Messrs. R. Sellew & Co.*)

Tin Plate.
IC, 10x14, Best Char..$ 9·50 | IX, 14x20, Roofing....$11·50
IX, 10x14, " .. 12·00 | IC, 20x28, " .... 19·00
IC, 12x12, " .. 10·00 | IX, 20x28, " .... 23·50
IX, 12x12, " .. 12·50 | IC, 10x14, Coke..8·50 @ 9·00
IC, 14x20, " .. 10·50 | IC, 14x20, " .... 9·00
IX, 14x20, " .. 13·00 | IC, 10x20, " .... 14·00
IC, 14x20, Roofing.... 9·00
Usual difference for odd sizes.
Block Tin.
Large Pigs....25c | Bars....27c
Small " L. & F....26c
Sheet Zinc.
Casks....℔ ℔ 10½c | Sheet....℔ ℔ 11c
Solder.
No. 1, Refined, in bars or plate....16c
No. 2, " " "....15c
Pig Lead....7½c
Sheet Copper.—14 to 100 lbs. Sheets 30x60....31 c
10 to 12 lbs., " " and 30x72....32c
6 to 9 lbs., " "....33c
Tinned, 14 and 16 oz. 14x48....52c
Planished, 14 and 16 oz. 14x48....39c
" No. 7, 8 and 9....41c
Copper Bottoms....34c

Sheet Iron.—	Com'n.	Sm'th.	Char'l.	Jun'ta
No. 16 to 20	4½c	4¾c	6½c	7½c
No. 22 to 24	4½c	4¾c	6½c	7¾c
No. 26	4½c	5 c	6½c	8 c
No. 27	4¾c	5½c	6¾c	8½c

Galvanized Iron....dis 30 %
Iron Rivets....dis 25 %
Iron Wire....dis 35 %
Coppered Pail Bail Wire....dis 20 %
Copper Rivets and Burs....dis 20 %
Genuine Russia Iron.
Perfect—No. 9, 10, 11, 12....per lb. 17c
Stained—No. 9, 10, 11, 12....per lb. 16c
Tare 22 lbs to Bdle. For less than 1 Bdle. add 1c. ℔ ℔.
Retinned Stamped Ware....dis 20 %

CHICAGO.

(*Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.*)

September 10, 1875.

Tin Plate.—
10x14, IC, Ch'l. Good.$ .... | 14x20, IX, Ch'l Best. $13 00
10x14, IC, " Best. 9 50 | 14x20, IXX, " " . 15 50
10x14 IX, " " . 12 00 | 14x20, IXXX, " " . 18 00
12x12, IC, " " . 10 00 | DC, 100 Plate, " " . 9 50
12x12, IX, " " . 12 50 | DX, " " . 12 00
14x20, IC, " " . 10 50 | DXX, " " . 14 50
| DXXX " " . 17 00
Roofing IC, Charcoal, Best....9 00
Roofing IX, Charcoal "....11 50
20x28, IC, Charcoal Roofing, Com....18 00
20x28, IC, " Good....18 50
20x28, IC, " Best....19 00
20x28, IX, " "....23 50
10x14, IC, Coke Plates....8 50 to 8 75
14x20, IC, "....9 00 to 9 50
10x20, IC, "....14 00
Block Tin.—
Large Pigs....25c | Bars....27c
Small....26c
Zinc.—Sheet, 500 to 1000 lb. Casks....10½c
Loose Sheets....11c
Slab Zinc or Spelter....7½c
Copper.—Bottoms....34c
Sheathing....32c
Planished....39c
" Boiler lengths....41c
Ingot....—
Bolt....35c
Braziers' Sheets.—
30x60, 6 & 7 lbs....℔ ℔ 39c | 30x60, 10 & 12 lbs...℔ ℔ 33c
30x60, 8 & 9 lbs...." 37c | 30x60, 15 to 100 lbs. " 32c
Solder.—F. S. & Co.'s make.
Best Fine....20c
No. 1....18c
Roofing....17c
Braziers' or Spelter Solder....35c
Antimony....18c
Babbit Metal—F. S. & Co.'s....16c
No. 2....14c

Sheet Iron.—	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24	4½c	5½c	6¾c	8½c
25 & 26	4¾c	5¾c	7 c	9 c
27	4¾c	6 c	7½c	9½c

Galvanized Iron....dis 30 %
No. 16 to 20....12c | No. 27....15c
21 to 24....13c | 28....16c
25 & 26....14c
Russia Iron.— | No. 1 Stained....16c
Perfect....17c | In Sheets, 1c. higher.
American Russia.— | B....11c
A....14c | In sheets, 1c higher.
Lead.— | Lead Pipe, in full coils .8½c
Pig....7½c | Lead Pipe, when cut..8¾c
Bar....8½c | Sheet Lead....9½c
Wire—Bright....dis 35 %
Coppered....dis 30 %

TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

ShiveGovernorCo

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

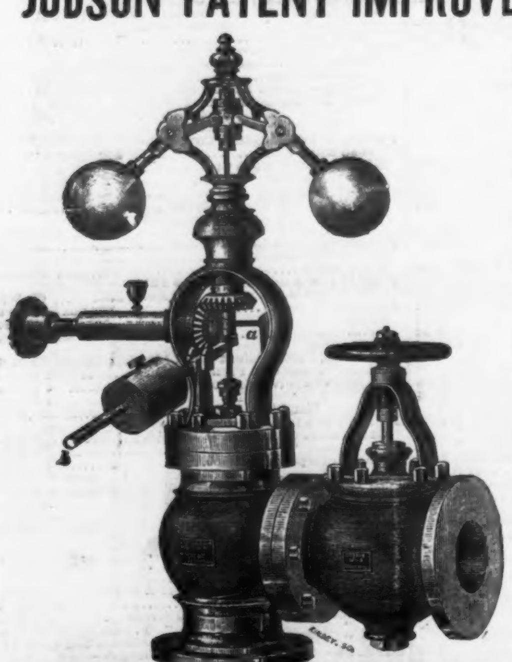
Buoy's Patent Counter Scale,

No Nest of Weights.

Circulars sent free

February 10, 1875. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



W[hen] Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in inches.	Price, Black.	Price, Bright Finish.	Price, Portable.	Price of Lever Attachment for altering speed.	Price of Stop Valve.
½	18·00	20·00	17·00	..	..
¾	20·00	22·00	19·00	..	..
1	24·00	27·00	22·00	2·00	5·25
1¼	29·00	32·00	27·00	2·25	6·62
1½	34·00	38·00	31·00	2·50	8·50
2	41·00	46·00	38·00	2·75	11·50
2¼	47·00	54·00	..	3·25	16·00
2½	50·00	57·00	47·00	3·50	17·00
2¾	55·00	62·00	No Larger Portable made than 2½ in.	3·75	19·00
3	62·00	70·00		4·25	22·00
3½	71·00	80·00		4·50	27·00
4	81·00	92·00		5·00	32·00
4½	91·00	103·00		5·50	37·00
5	102·00	114·00		6·00	42·00
5½	116·00	129·00		6·50	48·00
6	134·00	148·00		7·00	55·00
7	160·00	176·00		8·00	69·00
8	199·00	219·00		9·00	82·00
9	230·00	255·00		10·00	..

No Charge for Boxing & Cartage.

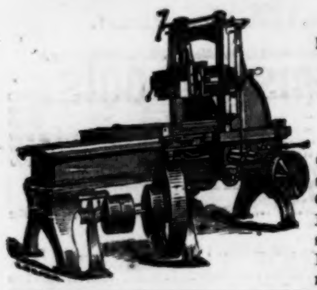
It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

JUNIUS JUDSON & SON, Rochester, N. Y.

The Pratt & Whitney Co.,

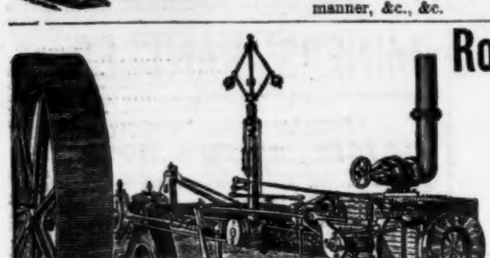
Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co

CHESTER, PA.

Corliss Engine BUILDERS

AND

Boiler Makers.

THORNE, DeHAVEN & CO.

21st Street, above Market, PHILADELPHIA.

DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

VERTICAL DRILLS. Self-feeding—of new and improved designs.

MULTIPLE DRILLS. For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

HORIZONTAL BORING AND DRILLING MACHINES. For large pieces—with boring head, adjustable, vertically and horizontally.

SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.

BLAKE'S PATENT STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength

For reducing to fragments all kinds o hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

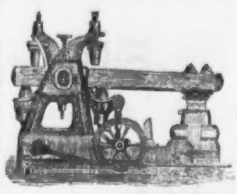
IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for [cr]ushing Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.

For Illustrated Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven, Conn.

BRADLEY'S CUSHIONED HAMMER



Has Larger Capacity,

Is More Durable, takes up Less Room, does More and Better Work with less expense for Power and Repairs than any other Hammer in use.

GUARANTEED as RECOMMENDED.

Address, BRADLEY MANUFACTURING CO., Syracuse, N. Y.

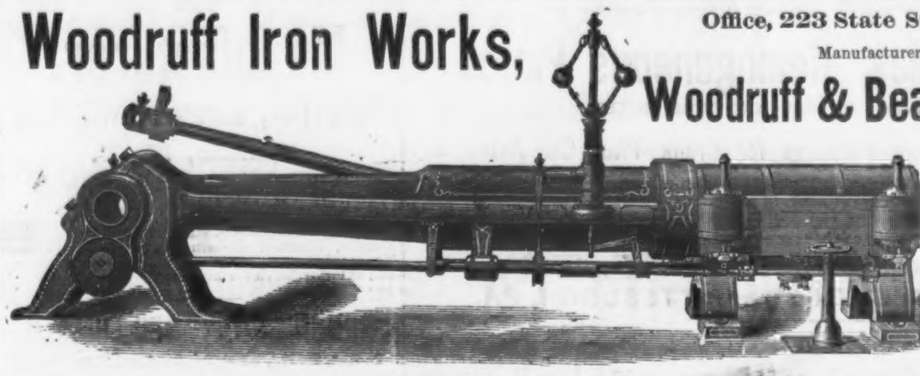
Woodruff Iron Works,

Office, 223 State Street, Hartford, Conn.

Manufacturers of the Celebrated

Woodruff & Beach Steam Engine,

With recent valuable improvements.



Steam Boilers

Constantly on hand and made to order any size or style. Special attention given to the manufacture of

MILL WORK

And all kinds of Machinery.

CASTINGS

Of any size or style. Direct all letters to The Woodruff Iron Works, Hartford, Conn., as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

Knowles Patent Steam Pumps

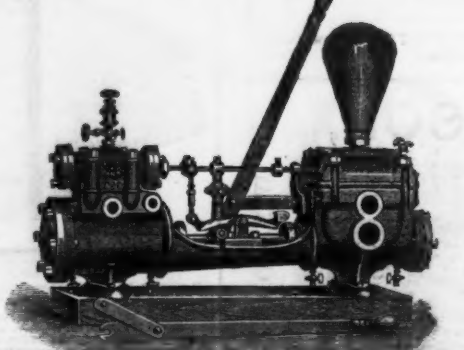
MANUFACTURED BY THE

KNOWLES STEAM PUMP WORKS,

WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.



Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS, a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

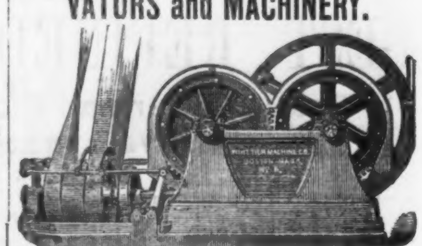
Every machine furnished under a complete guarantee.

Whittier Machine Co.,

1176 Tremont St., Boston, Mass.

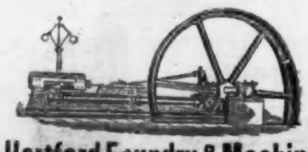
Manufacturers of

STEAM ENGINES, BOILERS, ELEVATORS and MACHINERY.



This Company has just received the highest award, a Gold Medal, for Safety Elevators, from the Massachusetts Charitable Mechanics Association.

CHARLES WHITTIER, Prest. JAMES STURGIS Treas.



The Hartford Foundry & Machine Co

Successors to the

Woodruff & Beach Iron Works,

HARTFORD, CONN.

J. S. Hunter, Prest. E. J. Murphy, Treas. & Sec.

High and Low Pressure Marine & Stationary

STEAM ENGINES AND BOILERS,

Mining, Powder & Paper Mill Machinery,

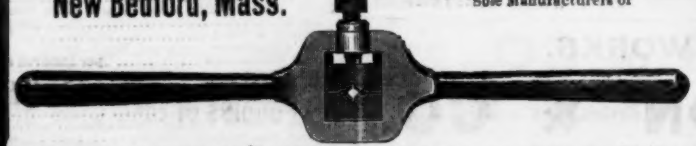
And every variety of Iron and Composition Castings made to order.

The following are a portion of the Engines manufactured at these works, and are a sufficient guarantee of our capacity for doing first-class work, viz.: The Pumping Engines in the cities of Brooklyn, N. Y.; St. Louis Mo. and Hartford, Conn., and in the Charlestown, Mass. and Norfolk, Va. Navy Yards, and the engines in the U. S. Steam Sloops of War Michigan, Kearsage, Manitou, Minnetonka and Piscataqua and the Gun Boats Cayuga, Pequot and Nepsic, the Government Transports Dudley Buck and Geo. C. Collins, and the Steamships America and United States. Also the large Horizontal Engine for the new Plate Mill of the Bay State Iron Co.

Morse Twist Drill and Machine Company,

New Bedford, Mass.

Sole Manufacturers of



MORSE PATENT STRAIGHT-LIP INCREASE TWIST DRILL.

Beach's Patent Self-Centering Chuck.

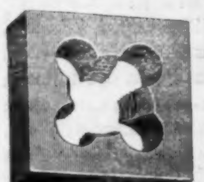
Also Manufacture Patent Taps and Dies, Patent Screw Plates, Patent Tap Wrenches, Pipe Taps and Pipe Reamers, Gas Dies.

SOLID AND SHELL REAMERS.

All Tools exact to Whitworth's Standard Gauge.

Drills made to fit any Socket desired.

EDWARD S. TABER, Treas. GEO. R. STETSON, Supt.



GEORGE FOCHT,

Iron Foundry, Machine & Sheet Iron Works,

First and Adams Streets, Hoboken, N. J.

Inventor, Patentee and Manufacturer of the Celebrated Self-dumping Hoisting Tubs. Iron, Coal Cars, side or bottom dumping. Iron Dock and Hook Blocks, Iron Sheaves, with or without Steel Friction Rollers for Chain, Wire or Hemp Rope, of every size and description. Iron Box Wheelbarrows, Coal and Coke Barrows, Charging Scoops, etc., for Gas Works, and Sheet Iron Work in general. Improved Mast Shoe and Gaft Socket Castings, and complete Iron Work for Mast and Gaft made to order and put up if desired. Machinery, Building and other Castings on hand and made to order. Illustrated Circular and Price List sent on application.

Machinery without Lubricant

METALINE.

Machinery Metalined, or Metaline furnished to Machine Builders.

No oil or attention required. Runs with little or no wear. No dirt or danger from fire. No damage to goods in process of manufacture. Years in use by best concerns, who are refitting old, and ordering new machinery to be metalined.

AMERICAN METALINE COMPANY,

61 Warren Street, New York City.

Clark's Patent Noiseless

Pressure Blowers and Exhaust Fans.

R. W. WILD, Agent,

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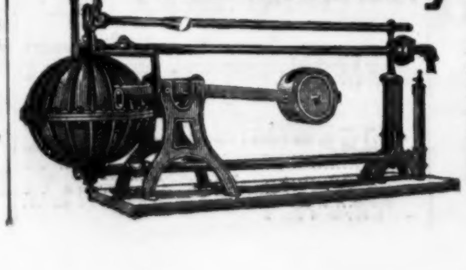
Portable and Stationary Engines, Boilers, Grist Mills, etc.

The Albany Steam Trap.



This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,

Albany, N. Y.

Patented Steam and Hydraulic, April 1, 186

EAGLE PACKING,

Of various sizes for ENGINES and PUMPS manufactured by JAMES GLANDING & CO., No. 115 Queen St., Philadelphia. What the proprietors claim for the Eagle Packing: 1. Its general adaptation to all purposes for which packing is used. 2. Its durability. It will outlast any other article in use. 3. Its cheapness. It can be furnished to the consumer at a lower rate than any other packing